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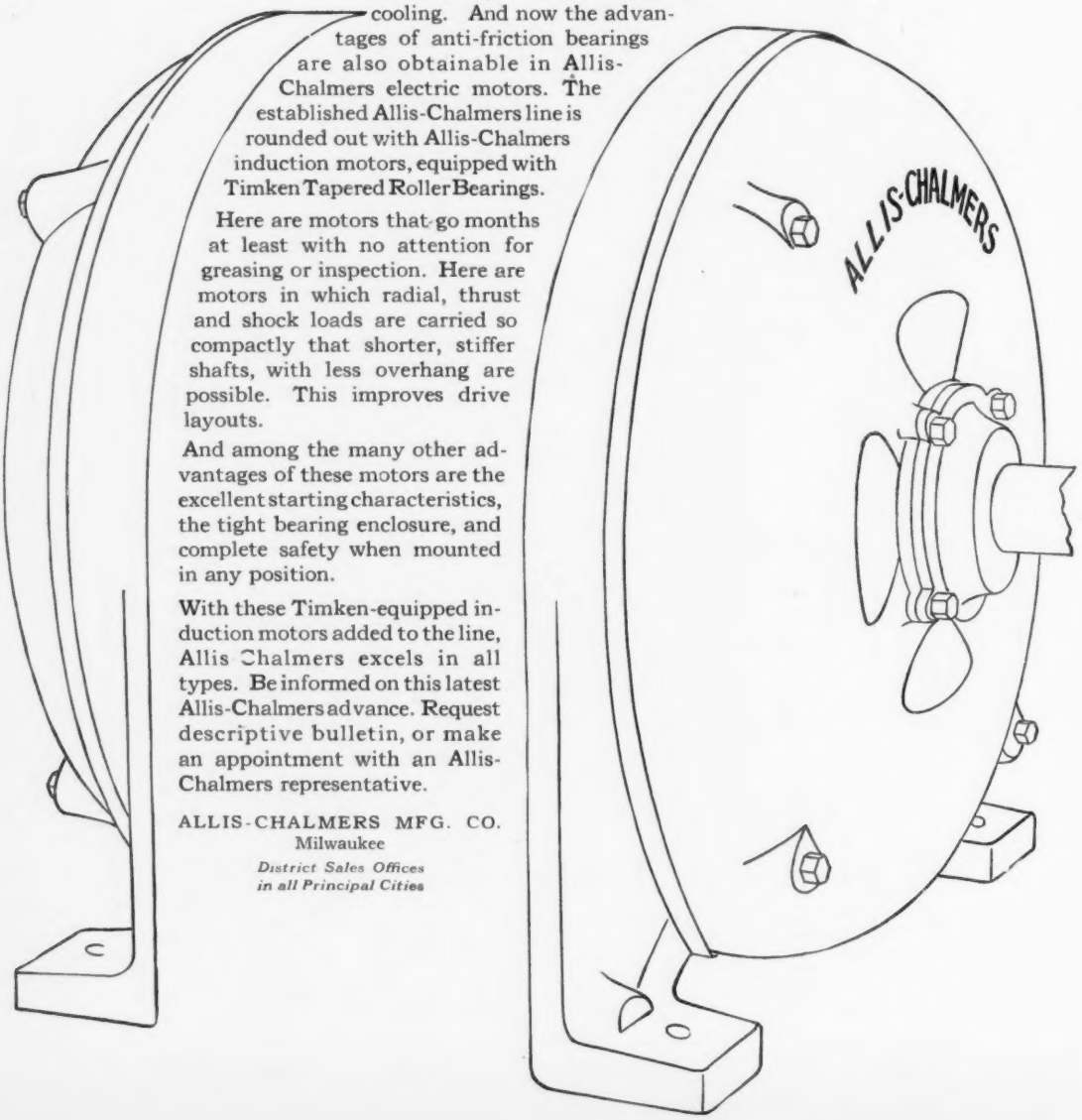

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Announcing a New Method of Producing Bleach Liquors

WHEN our technical staff first attacked the problem of absorbing Liquid Chlorine to produce bleach liquors there was available only the old-fashioned tower system. We first suggested the desirability of using the refrigerative effect caused by the vaporization of the Liquid Chlorine by means of our evaporating coil now in successful use in more than a score of paper mills and several large textile mills.

The development announced herewith has been brought about by our realization of the need for a method allowing more rapid absorption and more flexible utilization of existing bleach house equipment. The accompanying cut shows the construction of the chlorine absorber and its location in the chlorinating system. This new equipment posseses the following advantages:

Simplicity in construction and operation are secured by the fact that the vaporization of the Liquid Chlorine and its subsequent absorption by the milk of lime solution is entirely effected within the chlorine absorber. In connection with the unit batch system with the ton container as the base for the desired batch, it furnishes foolproof operation with any grade of operating labor.

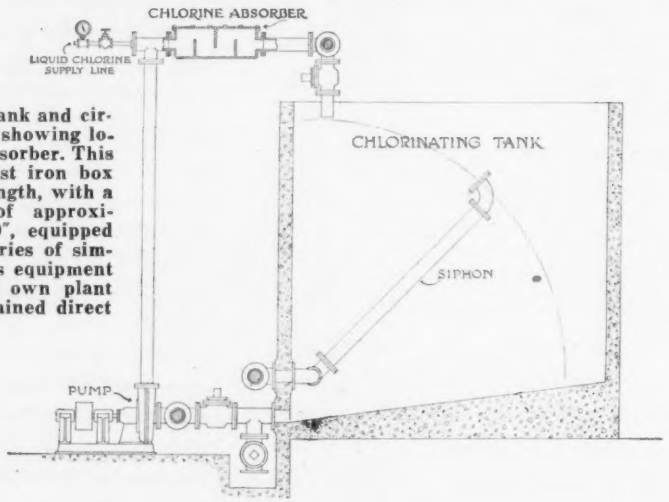
Refrigerative Effect of vaporization is utilized even to better advantage than with the coil, since it is localized just where the heat of reaction of the combination of the chlorine and the lime is momentarily concentrated.

Rapidity of Absorption is such that chlorination can proceed at the rate of 2,000 pounds of chlorine per hour or better, depending on the capacity of the circulating pump. The advantage of this speed for large operations is evident.

Flexibility is a prime feature of this method, in that a single "Chlorine absorber" can be used to successively chlorinate any number of tanks.

Accurate Control of the liquor, when the unit batch system is not used, is assured by the fact that liquor is available for testing at the exact point of chlorination.

Few textile mills require such rapidity of absorption as is possible by this new method. This is but one of many Mathieson developments, however, in the manufacture, transportation and use of Liquid Chlorine, all of which accrue primarily to the benefit of our customers. Because consumers appreciate this fact, the Mathieson Company is today the largest shipper of Liquid Chlorine in the United States.



Chlorinating tank and circulating system, showing location of new absorber. This consists of a cast iron box about 2 ft. in length, with a cross section of approximately 10″ x 10″, equipped inside with a series of simple baffles. This equipment is made at our own plant and may be obtained direct from us.

The MATHIESON ALKALI WORKS, *Inc.*

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With the Publishers—

Discussing a Problem Helps to Cure It.

Two men penned up for weeks in a snow-buried cabin on the mountainside—that's the idea in a book called "Cabin Fever."

They were close friends before the blizzard imprisoned them. After several weeks of enforced companionship, they were ready to spring at each other's throats. They found fault with each other constantly and every fault was magnified in their imaginations until their hatred of each other almost overpowered them.

Soon after the snow melted they were good friends again; the grievances seemed only fancied.

That's "cabin fever"—the hatred of being penned up with somebody or something.

Sometimes a cotton mill man gets "cabin fever" from sticking too close to his work. The first thing he knows, he begins to hate certain disagreeable little features of it. He magnifies these until he is almost willing to swear it is the worst occupation on earth.

And if he is situated so he can't get out and get around his resentment grows. But if he can get away in body or mind the grievances do not seem so big. He can go ahead with his work with renewed energy.

COTTON has helped cure many cases of "cabin fever" by coming along just at the time when some mill man, who sticks pretty close to his work, has reached the stage of almost hating that work because some one branch of it is at fault.

Other mill men are generally the chief figures in COTTON'S rescue party. Usually some other mill man has been "snowed in" with a similar problem but managed to "dig himself out" of it before he had been attacked by "cabin fever." When the account of how he did it is read in COTTON the first man's troubles begin to melt away; he can see freedom for himself again.

A few months ago a man in South Carolina, making domestic broadcloth, had trouble with excessive shedding at the loom. He worked with his difficulty, but he also confided his troubles to his co-readers in the "How Other Men Manage" section of COTTON. As a result he received through COTTON an invitation to visit the mill of a man in his own state. In August COTTON a man in Massachusetts tells how another mill solved this difficulty. And in this number a mill man in Maine, who has produced some two million yards of these goods in the last year, outlines still another way to overcome the South Carolina man's trouble.

This incident furnishes a concrete example of how this "cabin fever" cure works.

At other times it is advertisers of equipment and supplies using COTTON'S pages who effect the rescue and the **cure.** They have helped "dig out" many a mill man who has been "snowed in" with operating problems and frequently they know just about what he is up against. They know the things that wear on mill men's nerves and their products are things intended to make life easier for the cotton mill man.

A regular monthly visit by COTTON, with the proper use of its facilities by the mill man, is the means by which many difficulties are overcome.

AMONG COTTON'S READERS

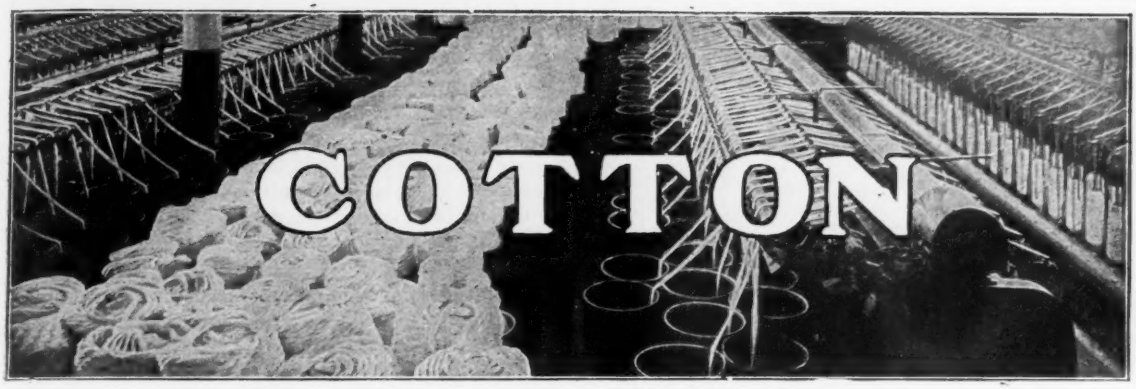
J. A. Sorrells, Superintendent,

Gainesville Cotton Mills,

Gainesville, Georgia

"I wonder if the many officials who read COTTON fully realize its valuable place in their libraries as a source of reference on the different problems frequently confronting them."

J. A. Sorrells



September, Nineteen-Twenty-Five

Business Sets Up Its Own Courts.

In the civil courts having jurisdiction over litigation in New York County, New York, it is stated authentically that nearly 30,000 controversies await disposition. Though in that jurisdiction there are more than thirty judges who sit practically all the time, only around 9,000 cases can be handled each year. The result is that it takes from three to four years' time for an ordinary suit to come to trial. Another result is that the courts there and in many other localities have become the resorts largely of those only who want to avoid rather than of those who truly seek justice.

In the Federal courts there are now nearly 150,000 cases, both civil and criminal, awaiting trial. The number docketed each year has more than doubled within the last five years. Like increase has taken place in the courts of many of the States.

Much of this owes to the multiplication of statutes, which lately have been ground out by the legislative mills of the country at the rate of ten to twelve thousand a year. More of it owes to the growing complexity of the laws, particularly as to civil proceedings, because of the increasing volume of precedents, in the main technicalities. There are now nearly 20,000 volumes of reports through which these spread. "No law office, however numerous its force, can pretend to sift a mass of material so vast as this," declared a President of the American Bar Association a year or two ago.

Through it all there extends the hand of the past, sometimes live and benign but often dead and blighting. For example, until quite recently the courts of this country commonly have followed a rule of law laid down by Lord Coke in 1609, in what is known as Vynior's case, to the effect that any general agreement to make private adjudication of disputes is against public policy and invalid in so far as it undertakes to 'oust the courts of justice of jurisdiction.'

In Great Britain, where the rule originated, this anomaly of the law was corrected a quarter of a century ago. Only in recent years have any steps been taken to correct it in this country. Several States, and Congress, have modernized it by giving full legal status to what is known as commercial arbitration. A majority of the States, however, have not yet done so.

The statutes that have been passed give warrant to and provide for the enforcement of contracts whereby parties to possible litigation agree in advance to submit disputes that may arise between them to boards of arbitration, or to individual arbitrators.

Several industries, operating through their associations, have thus been able to set up what are tantamount to private courts for handling disputes between their members, or between their members and those with whom they do business. One or two, notably the spice and silk industries, have long done this, despite the old rule of law. The new motion picture industry has made greatest progress towards perfecting the process. During the last year reported on, more than 11,000 disputes, most of which otherwise would have been taken into courts of law or equity, were adjudicated through the machinery provided for the purpose. Other industries are following suit. An organization, more or less representative of all, has provided machinery which any disputants may use for the purpose. It has developed a big quassi-jury list, composed of experts in virtually every line, which may be drawn upon, if desired, by disputants.

Controversies so adjusted are settled with an expedition, cost and apparent achievement of justice that are quite in contrast with those when the courts of law or equity are used. Most of these necessarily revolve around questions of fact rather than of law. Instead of juries, with no background of knowledge concerning the facts involved or judges saturated with devotion to hair-splitting technicality, men who are experts in the fields involved usually pass on the questions in a purely common sense way. The statutes make the judgments rendered enforceable as court decrees. They make these new adjudicating mechanisms real and active adjuncts of the courts.

Arbitration of course cannot supplant the courts in all civil proceedings. Moreover, as often used it has certain faults not usually peculiar to the courts, as faulty as the latter may be. One is the inclination of arbitrators to compromise, to "split the difference," between disputants. This, however, can be avoided by providing in advance for arbitrators not selected by the disputants in accordance with traditional rule.

The movement, abetted almost unanimously by bar and bench, is one of the most hopeful developments bearing on the administration of justice in this country. Another of perhaps equally hopeful kind is the work being pursued by the American Law Institute, a protege of the American Bar Association and the Carnegie Institution. This work

consists of an unofficial but what is intended to be an authoritative re-writing of the Anglo-Saxon common law, now scattered through a literature that is beyond the capacity of any person to master. The Institute aims to have experts cull from this mass the living principles of the law, which are to be set forth in the simplest and most compact possible manner for the guidance of bar and bench. In the absence of legal enactment, will they accept this recodification or treat it only as another addition to the imponderable mountain of authority which now renders the law a maze that often is as incomprehensible to professionals as to laymen?

The question is asked for the reason that history justifies a serious doubt as to whether lawyers can be depended on to reform the law. They dominate the law-making bodies; they run the courts; and they talk interminably of law reform. But most of the important legal reforms of the past, even movements like the present one that has to do with commercial arbitration as a substitute for litigation, have been initiated and promoted in the main by laymen. This is why the subject is one that is highly apropos for the consideration of laymen, particularly business men, who bear the tremendous and growing cost of litigation—a cost which, much of it being needless, Herbert Hoover says involves the probably biggest single waste of which we nationally are now guilty.

The Future of Muscle Shoals.

Ten years' time soon will have elapsed since the Federal Government made the first move towards the development of the great power and nitrates project at Muscle Shoals. Within a few months it will have spent around $150,000,000 of the taxpayers' money on the enterprise—which will be among the biggest of its kind in the world. Yet when, sometime this Summer, the project will be complete in its primary form, there will face it, as during the years since it was partially completed, virtual idleness only. For, though since the project was undertaken the Government has changed its mind—if there has been anything that can be so rated—at least a half dozen times regarding the enterprise, it is at present of virtually no mind concerning it. One would have to search far in the industrial world to find a comparative example of vacillation, hesitancy, uncertainty and indecision. The appointment of an investigating commission, authorized by Congress in lieu of agreement as to what should be done with the project, is perhaps as wise a move as could have been made at the time. But the move prolongs the controversy though it may in some measure clarify it. The personnel of the commission would indicate a conservative and practical approach by it to the problem—and at the same time the move virtually assures a renewal, unabated, of the old controversy when the new Congress takes up the subject. For the commission was selected evidently with the view of sustaining the inclination of the Coolidge administration to remove the property as fully as practicable from the political influences that have attended its treatment to date.

The controversy involves deep-seated principles, which no commission could clear up satisfactorily to all. Shall the enterprise be, as it was conceived, primarily a nitrates affair chiefly for protection in case of war with incidental service to agriculture in times of peace and only incidentally a power project? Or shall it be primarily a power project, with nitrates and fertilizers only incidental? Shall the Government turn it over, by lease or sale, to private operators, or operate it directly as an outright government ownership enterprise?

Scarcely anyone disputes the claim that the Government never would have entered upon the venture but for the nitrates factor and the military defense element in that factor. It was so conceived, so started, and so hurried at tremendous cost after we entered the World War. Yet this is an uncertain factor, because at any time the scientific world, which is carrying on big experiments in the field—some of them under the auspices of the Government—may make discoveries that will change the whole situation there. It seems proved that, by processes to be used in the nitrates plant there, no great, if any, reduction in the cost of nitrates for fertilizer use can be brought about, except possibly by what would be an immense governmental subsidy.

As primarily a big power project it is something of a key to the hydro-electric resources of the South. Can that key be entrusted safely to private interests? Those, like Senator Norris, of Nebraska, who stand out for the super-power method of future treatment, say that it can not be. Yet one wonders how governmental operation would be practicable when undertaken by a Government incapable, under such advantageous circumstances, of seeing that the public interests are protected in case of sale or lease to private operators. For the Government, in disposing of the property, may exercise the contractural rights of owner, in binding those who get it, and may thereafter employ the political powers of government in regulating the use of the property as a public utility. The project's ten-years' past history indicates quite clearly that, beyond seeing that it meets whatever purely governmental need that it can fill and renders the most feasible public service, the less the Government has to do with the operation of the project the better it will be. Already it has cost the public something like $100,000,000 more than any private interest is willing to pay for it.

The question of disposing of it will be before Congress when it meets again. And that question involves a good deal more than more or less illusory notions as to the cheapening of fertilizers.

The Last of Old Type Reformers Pass.

The deaths, within a few weeks of each other, of Robert Marion LaFollette, United States Senator from Wisconsin, and William Jennings Bryan, who more nearly than any other public man we have had was a "national" citizen, probably mark the closing of an era. They were virtually the last of the political reformers who confessed allegiance to the traditions of reform that came down from the sixteenth and seventeenth centuries, the traditions made by Hobbes and Sidney, Wilberforce and Gladstone, Thomas Jefferson and Ben Butler. While extremists, they kept within the bounds of the established order, which they might have strained, had they been allowed full sway, but would not have overturned. Neither of these outstanding old school reformers in the two old parties has a successor nor is likely to have one. Others will attempt to take their places but will fail.

The outstanding professional reformers of the future,

while perhaps for a time giving lip praise to them, really will view both LaFollette and Bryan as dangerous political reactionaries. They will be more for overturning, rather than for perfecting, the traditional scheme of things. Thus the lines may be drawn between true conservatism which has close kinship to true liberalism and outright radicalism. For the present, however, radicalism is in the eclipse. Its only chance now for getting from beyond the shadows is by boring from within. There will be a good deal of that, as always, and it will be carried on, as always, in the main by dupes, by "one-idea" persons and busybodies.

But eclipses are never enduring. Some day radicalism will emerge full-panoplied, with leaders who will be Bryans and LaFollettes at the latters' worst but not best.

Co-operation Between Grey Cloth Mills and Finishing Plants

BY PAUL A. MERRIAM, RESIDENT MANAGER AND L. L. BAMBERGER, SUPERINTENDENT
GEORGIA BRANCH OF THE U. S. FINISHING COMPANY, CEDARTOWN, GA.

Cooperation or team work is a desirable thing in every undertaking where two or more individuals or organizations are endeavoring to bring about a desired result. There has to be, and is, team work throughout the grey mill that is spinning the yarn and weaving the cloth and there has to be, and is, team work throughout the plant that is bleaching, dyeing and finishing this same cloth in order to obtain results that will please the converter and find ready sales. Why not have some of this same cooperation between the grey mill and the dye plant?

What is cooperation? It is mutual helpfulness, or helping each other; and the more people we can get to help us the easier is it going to be to produce results that count.

This article is written to suggest a number of ways in which grey mills can cooperate with and help the dyer and finisher. We believe a similar article should appear written by grey mill men in order that we finishers may profit by their suggestions. It will help each of us to know more about each other's problems.

One of the biggest problems of the dyer is the proper preparation of the grey goods to receive the dye. In the case of fancy dyes the goods ordinarily have to be thoroughly "bottomed" by kier boiling and bleaching, whereas in the case of heavy shades in sulphur dyes the goods are usually desized and washed. In either case our task can be greatly affected by the materials and methods used in the sizing of the warps by the grey mills. Zinc, Calcium or Magnesium Chlorides are sometimes used in the warp size. The presence of these chemicals in the goods causes the formation of insoluble mineral soaps where the goods are kier boiled preparatory to bleaching and these insoluble soaps collect locally in the fibers of the goods and can be removed only with great difficulty and frequently only by the use of expensive organic solvents in a series of extra operations.

Another difficulty with these Clorides is the possibility of the formation of Hydrochloric Acid in the cloth during the singeing operation although we believe that the danger from this practice has been somewhat over-estimated in the past. However, when relatively large amounts of these salts have been used in the warp size it is unquestionably true that pronounced tendering takes place due to the formation of free Hydrochloric Acid at the high temperature of the singeing operation. This tendering is much more apt to occur in cloth which is thoroughly "plate singed" than that which is singed with a gas flame; and when it occurs in contact with the hot copper plates of the plate singer Copper Chloride is invariably formed in the tendered fiber. Many times have finishing plants been blamed for tender goods that really were primarily caused by the grey mill.

Another chemical which is frequently used in warp size and which usually gives trouble in the proper preparation for dyeing is ordinary Sodium Sulphate or Glauber Salts.

The presence of Glauber Salts in the warp size seems to prevent the easy removal of the starch and in the case of full bleaching is usually carried into the kier where it retards saponification, especially at the beginning of the boil. In cloth dyed without full bleaching the use of this material is even more troublesome because its effect on the desizing operation is so marked that usually two complete desizing treatments are necessary to render soluble and completely remove the warp size. Besides increasing the expense to the finishing plant this causes unnecessary extra handling with the incidental liability for damage.

Paraffin Wax and other unsaponifiable and difficultly emulsifiable substances should never be included in the warp size of cloth intended to be dyed. In the case of cloth receiving a full bleach preparatory to dyeing this class of substances usually melt and localize in the cloth during the kier boil giving rise to spots which while practically colorless completely resist the absorption of the dye liquor and are practically impossibe to remove. Paraffin Crayon marks on the ends of pieces frequently melt in the kier and distribute these spots throughout the nearby pieces. In the case of cloth dyed from the bale after a desizing treatment the presence of these compounds in the size gives rise to poor penetration and local unevenness in the dyed warp threads.

While we are not in a position to prescribe the best warp sizing materials, we do feel that good results should be obtainable from a proper mixture of thin boiling corn starch suitably combined with Sulphonated Tallow, Glycerine, a trace of Gum Tragacanth and an adequate disinfectant to check mildew. A proper combination of the above ought to give satisfactory results in weaving and it will save the bleaching and dyeing plant much trouble and will result in better bleaching, dyeing and finishing.

Improper selvages can give the dyer and finisher a lot of worry. Sometimes light weight goods are woven with tight selvages. As these goods are pulled through the various processing machines the tension required to pull the goods becomes localized at these tight selvages and they break. Breaks of this kind frequently result in tearing entirely across the cloth with the consequent interruption and damage. There is another type of selvage that per-

sists in turning in and forming so-called "double edges." These double edges give trouble in the tenter frames and cause many yards of seconds. A fairly wide tape selvage or a wire selvage are both better than a narrow tape selvage.

Goods intended for sulphur dyeing in continuous machines and goods that are dyed direct from the bale are not bleached; consequently there is no way for oil spots to be removed prior to dyeing and they will show up in the dyed cloth as dark spots. Even worse spots result where soap or other so-called oil remover has been applied to the grey goods when these goods are dyed without bleaching. These same goods, however, can generally be satisfactorily dyed provided they are bleached first. Such goods dyed from the bale become, of course, mill seconds since it is absolutely impossible to dye such cloth in this way without these spots appearing. The grey mill can help themselves and their customers and the dyer very materially by sorting grey goods prior to packing so that goods containing oil and soap are kept separate from goods free from such difficulties. If they can then ascertain for what class of dyeing the goods are intended they can ship them out accordingly, making sure to send only goods free from oil where they are to be put into sulphur colors or where they are to be dyed direct from the bale. In this connection it is only fair to the grey mill that when cloth is to be dyed from the bale that the mill should be so notified by the purchaser.

In this same connection the final result will be better in the case of goods not bleached if the grey mill would be careful to omit pencil marks, etc., from the face of the cloth in the body of the piece. Such marks show through the dyeing and constitute an unnecessary defect in the finished cloth.

Some grey mills occasionally pass their cloth through certain finishing operations before packing, which operations would better be left for the finishhing plant. Occasionally goods are stretched for width in the grey mill. This makes it difficult, if not actually impossible for the finisher to give his customer specified finished width without tearing and otherwise damaging the fabric. Another finishing operation which is better left for the finishing plant is calendering. Calendering grey goods may possibly improve their appearance as grey goods but it is actually a disadvantage to the finisher in attempting to produce the best final result. Grey calendering seems to mash the heavier threads with the result that in sulphur dyeing in continuous machines and in direct from the bale dyeing a streaky effect is apt to result. Moreover scrimps and creases which are frequently pressed into the cloth come all the way through the process and are evident in the finished cloth. Our belief is that omitting these operations would not only save the grey mill an unnecessary expense but it would actually make a better final result. If stretching and calendering appears necessary the place for such operations is after the goods are dyed and finished.

There are numerous other ways in which the grey mill can help the finisher such as making sure that his bales are packed with the face of each piece laid the same way. It also assures evener shades in dyeing without bleaching if goods woven at the same period are packed and shipped out together. In other words goods woven under different conditions will contain variations in the warp size which will give corresponding variations in the desized cloth and this in turn variations in shade. It is frequently found that two pieces of cloth passing together through a dye bath will show entirely different shades on opposite sides of the seam in cases where variation in grey goods has been pronounced.

In concluding we believe that active cooperation and especially exchange of information between dyers and grey mills can be of great benefit not only to the dyers and grey mills themselves but to the converters and consumers. Let us therefore get together, cooperate and help each other to improve the industry as a whole.

A Study of Cotton Hedging.

Wide and rapid fluctuations in the price of raw cotton during recent years have emphasized the speculative risk inherent in the ownership of this commodity. This has caused mill executives to consider whether such risks can be avoided by a consistent policy of hedging on the organized market for futures contracts.

The Harvard Bureau of Business Research has just issued Bulletin No. 49, which presents the results of an experimental study made by the Bureau to throw light on the feasibility of protective hedging. It is "A Study of Cotton Hedging for a Grey Goods Mill, 1921-1923." The mill selected for this study did not actually follow the hedging policy, but the study proceeded by constructing, on the basis of the purchase and sales records, the hedging transactions as they would have been made, to determine whether the mill would have shown a gain or a loss on futures contracts if it had consistently hedged its purchases on the New York Cotton Exchange during the period from November 1, 1920, to November 1, 1923. Since this was a period of generally rising prices it was to be expected that hedging transactions would show a net loss, but that the value of cotton holdings would increase.

This bulletin includes an explanation of the practice of hedging, a statement of the data used in the study, a description of the hedging transactions as constructed from these data, and the results of these assumed sales and purchases of futures on a protective hedging policy. Thus it provides some practical information which is typical and applicable. Copies of the bulletin may be secured for $1.50 each, by addressing the Bureau of Business Research, Lawrence Hall, Cambridge, Mass.

The Industrial Advertising Company, S. M. Fecheimer, has expanded into an enlarged advertising organization known as Fecheimer, Frank and Spedden, Inc., with new and enlarged offices at 415 Brainard Street, Detroit, Michigan. All of the men involved in the formation of the new company are well known in the advertising world. Mr. Fecheimer was from 1904 to 1923 connected with the Truscon Steel Company, handling, during the last fifteen years of that connection, all of the advertising and publicity for that company. In 1923 he organized the Industrial Advertising Company. Samuel G. Frank, vice-president, has, until this connection, been with Campbell-Ewald Company. Roland G. Spedden, secretary, has been manager of the retail department of Campbell-Ewald Company. Fecheimer, Frank and Spedden, Inc., render a complete service in all fields of marketing and advertising, including industrial, mercantile, financial and general advertising.

Scientific Trends with a Textile Slant

This winter, that the scientists say will be one of unusual severity, can be eased to a considerable degree by taking thought along two lines.

Several elements of protection and husbanding of resources of the plant may be applied with equal reasonableness in either warm or cold latitudes. Of course, the usual methods of winter protection should be resorted to —these will make the accompanying plant-protective suggestions of even greater force.

On the other hand, considerable thought should be given, at this time, toward the organization of an increasingly profitable line of production for the cold weather market. This may be a new line of "winter preparation," but it is an advantageous one to be able to sell better as well as to "sit better."

Winter Ventilation.

The best working efficiency in the mill demands, all the time, air that is as fresh as the surrounding outdoors. Having in mind the necessity for balanced humidification it may be that one would doubt the possibility of realization of such a thing when the plant is closed against winter weather.

Further consideration of the matter, however, shows that the moisture content can be adjusted to any rate of ventilation laid down. The thing is to insure that this rate is sufficient to give freshness of air equivalent to that of the outdoors.

Particularly during the period of the first closing of doors against inclement weather, attention to this matter of maintaining outdoor purity of air is quickly reflected in productive efficiency. Since the air of autumn and early winter is so much more bracing than that of summer this produces, in fact, an *increase* in working power. The secret is to keep up the standard of freshness to an open-air equivalent.

No Season.

A very fine plant, that had had its lighting system converted to the daylight variety, brought the remark from its manager that they now "have no season."

This is as it should be—and the benefit is reflected in two kinds of dividends: Better work, and less reaction of the individual to the nerve tax of adjusting to each new seasonal condition of light.

It takes very good engineering and very good equipment, indeed, to produce such a result. But the plant that possesses it forges ahead and stays ahead of its fellows in steadiness of high-productive result.

Sheltered Work.

Economy in labor cost is fully as much a matter of prevention of annoyance to labor as it is a problem of providing convenience in facilities.

Several mills of our acquaintance provide inter-communication between separate buildings by protected runways. The saving ultimately effected is not altogether one of time, that usually spent in getting on extra clothing on a bad day, although this is not inconsiderable. A great proportion of the effectiveness of a working schedule depends upon the snap and cohesion of work. Diverting elements, causing forgetfulness of details and keeping the mind from the work, seriously injure this element.

Money spent, in reason, on weather protection of the loading and handling area, the materials supply yard, and the surplus equipment pile, is investment in clear functioning of thought—insurance of continuity of action.

Winter Cloths for Moderate Means.

Cotton manufacturers ought to be able to compete with makers of warmth-producing fabrics in other lines—could do so, in fact, by paying attention to the exact elements of competition. This would give them not only price but desirability advantage—a large matter in the medium-priced range of goods

A great deal of canton flannel sells at an average of 50 per cent higher than outing flannel, with some justification, too. It has longer life. There is room for a cloth that will combine the wear-resistant qualities of the hard surface of canton flannel with retention of the fleeciness of both. But this warmth-producing fleece should not be expected to wear, on the surface, that causes it to give out in mid-season.

Several types of construction can be adapted to give this effect. It is a result that will furnish favorable competition with woolen goods if so designed that the fabric can be priced right. For a large number of people, woolen goods are a manifest impossibility in price. This fact gives the cotton industry an opportunity to do a service and make an additional profit.

Warmth Factors in Cloth.

The entire problem of competing, with a material such as cotton, against other materials which appear to have

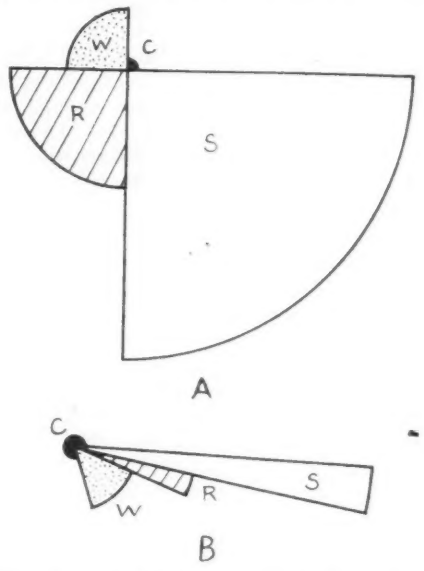


Illustration of the discrepancy between cost per pound of the four chief textile fibers, Cotton, Wool, Rayon and Silk.

A: Relative cost per pound.

B: Same, considered from viewpoint of pounds consumed of each in United Stlates.

The middle ground between cost per pound and supply available to market may be struck by adaptable cloth design.

super-advantages in the element of heat and cold resistance and moisture absorption, is largely a matter of analysis of *all* the factors in the problem.

These factors are more than the inherent nature of the fibers involved. Texture, grain, state due to treatment, etc., are vital matters.

In view of this and the decidedly important figures of

relative price per pound and supply consumed annually, it would seem to be very worth while to redraft some fabric design so as to accord with the possibilities of application for a fiber so inexpensive, so plentiful and so adaptable as is cotton.

A Temperature-Resistant Cloth.

Many people have noticed the resistance to the blast of weather afforded by cloths of the satin group. This is in point in bathing suits of sateen.

By the same terms, a field exists for moderate-priced underwear for medium and cold weather use.

Working in a proportion of satin surface in a cloth will reduce the total weather penetration of a garment. If, in addition, a more absorbent and less "plated" texture can be used for the under surface of the same, toward the body, a very likely combination might be effected.

In this connection, it might not be altogether outside the limits of possibility to effect a satin-effect on knitted goods. It would be a welcome achievement, with unlimited style possibilities.

Retail Selling Direct from Production.

A manufacturer of textile specialties has introduced a valuable innovation into the service and economy element of manufacturing by providing his customers with statistics and service to govern the ordering and control of their stock numbers.

Although this is of enormous benefit to the customer it has just as much value to the producer. It is one of the keys to economical production, enabling a mill to place its major energies upon numbers it knows will sell.

One feature of this plan is the close tie-up between mill production schedule and delivery to customers' stocks. While a factor of safety is provided it eliminates much of the former annoying element of "loading" a customer's shelves.

What a fine opportunity studies of this kind give to the manufacturer to make test-researches of the suitability of *new types*, and to keep ahead of the field by this means.

Human Relationships in Industry

BY W. M. McLAURINE.

Waste, the Curse of the World.

In the preceding article waste of materials and machinery was largely considered. In this conference, other kinds of waste which are probably the keys to waste of materials and machinery will be discussed.

The first great waste that suggests itself is Time. There are twenty-four hours in every day. The average person sleeps eight and eats one. This leaves fifteen hours for work and recreation. There may be considered two questions here. How much time is wasted during the working hours? How much time is wasted during the rest or recreation hours?

I am a wage earner myself. I consider that when I entered into an agreement with my present employer that during my working hours I am to render the best and most efficient service that I can possibly give. I consider that my employer desires for me to take every legitimate advantage of my time for rendering service to him. That means that I must grow on my job. I must constantly study and work and plan for bigger and better things. And yet an employee told me this story.

He was employed by a new firm. He had been accustomed to saving every minute of time that he could. He tried to render all of the service possible in his working hours. He did this for several days. At the end of that time one of the old employees called him aside and told him that he was rendering too much service during the day, that he must "slack off," that he would get the others in bad. The old employee said, "We work just enough to 'get by,' that is our slogan." Waste of his own time and that of his employer did not worry him in the least. He was an enemy to himself, to his employer, and to society. He was forming bad habits for himself, setting a bad example for his associates and preaching a Bolshevistic philosophy in a Christian and democratic world.

It would be a real interesting study to have some one with a stop watch to observe us during the day, carefully recording the actual time we consume in the discharge of our duties. I believe that with the average mill hand the percentage for active time would not be more than 60 per cent. In other words, if the employees "put in" 55 or 60 hours per week on their jobs, the actual production working time spent is about 33 to 36 hours. The question may arise as to why not make a shorter day then. There are two reasons.

The first is that machine production determines the operative day rather than the human production of the plant. The machines can turn out only so much and must turn out a certain standard amount to be operated economically. The human element cannot speed the machine any faster. The second reason is, if the machines would allow it, it is not possible to find people who will or can put in the energy needed for a shorter day. This may seem to be a digression, yet it is not. The point that I wanted to make is that, on the job during the working hours there is much time that the operator does not consume in the discharge of his duty. What does he do with it? It is a question I can not answer. The overseers can answer or find out. It should not be wasted. I greatly fear that much of it is wasted. The problem of the overseer is to see that this time is not wasted. The operator must use it well. It may be his study period. It may be his observation period. It may be his time to make notes of things he wants to know or find out. The amount of time wasted on the job will make a very interesting study.

The second waste of time comes in using or not using the four or five hours of leisure. The hours when we have "nothing to do," as we often express it. When we are resting, we are rusting. A manufacturer told me a few days ago that his machinery and plant in general depreciated more when it was idle than when it was in full operation. The greatest problem of the American people today is how to spend leisure hours profitably. There is a great cry for shorter working hours and more leisure, but so few people have sense enough to use leisure time. Most people simply sit around, and gossip and talk about things that are of no value and do things that are destructive to their general welfare. Rest does not mean cessation from work. It means a change of work.

Idleness is the devil's workshop. Idleness begets indolence and slothfulness. Idleness is expensive because we are non-productive during that period. Idleness begets restlessness and dissatisfaction. It creates an abnormal demand for excitement and expenses. It creates abnormal desires. It gives the mind time to brood and concoct wild schemes of adventure and unreality. It leads us away from the real standards of life into the mystic maze of imaginative senselessness. How do you spend your leisure? Some people in employing new help industriously inquire into how leisure time is spent. Suppose you carry a little book and at the end of the day, before you retire, you make a record of how you spent your leisure time. Write it all down carefully and honestly. Then go back over it and check with a plus mark the things that were worth while, and a minus mark the things that were of no value. Then indicate, at the bottom of the page, the things you could have done that would have been worth while—the opportunities that offered themselves during the day and you let them go. Do this for a week and see how you are spending your time. I believe it will awaken you to a much better distribution and employment of it.

"It is too much trouble to do this," I can hear you say, "I am doing well enough, so why worry?" It is a peculiar trait of humanity that we enjoy certain forms of ignorance and deception. If you feel that way I suppose you belong to the great existing throng and not to the climbing, ambitious, growing few, who really push the world ahead and lead civilization on.

Another great waste occurs in Energy. This is a very strenuous age. Many people are living strenuous lives. They are in a hurry. They are in a hurry to get through. It may be that they have nothing else to do, or it may be that they want to get through to do something else. This something else may be of value or it may not be. Automobiles, aviation, world demands are strenuous. Our energies are being taxed in daily toil or daily pleasure. We seldom read of a man working himself to death. We do occasionally. We read every day of murders, suicides, deranged minds, and many other maladies of mankind. These occur because energy gives out and despair comes in. A few days ago one of the most noted debutantes of a few seasons ago, killed herself, because the social strain was too great. How are you spending your energies?

The world really moves guided by the placid and composed, reflective mind of the thinker. Most of us today are imitators. "Keeping up with Susie" is the slogan. How are you spending your energies? Are they on things worth while or are they on the seafoam and froth of life? Have you ever stopped to consider values? What things are really worth while? Do you ever sit and take up your daily activities, your works, worries, and social duties and put them on the scales of judgment and common sense and weigh them? I believe God gave to every man sufficient energy to accomplish the work designed for him. If it is giving out, it is being used wrongly. Are you always tired and nervous? Then you need a doctor and someone to help you plan a sensible day. You must not only plan the expenditure of energy for a day or year, but for a lifetime. The normal desires of life are in keeping with normal energies. The abnormal desires require abnormal energies. Take stock of yourself as I have indicated and if you are using your energies abnormally get them right and be happy. If you are not using your energies to their fullest extent get them right and be happy.

Another great waste is Money. Most people have street car salaries and Packard ambitions. Most people think that happiness consists in the possession of material things. I have never had much money but the little that I have had and the observations that I have made impel me to believe that money will not bring happiness. Happiness is a state of mind and not an "external condition." We read in the Bible about the rich young man who had everything and was still unhappy. We see examples in the movies. The papers and periodicals are full of stories which prove the statement.

I heard a story once of a man who started out to find a happy man. He went through all the strata and forms of social and industrial life and finally found a happy man. He was a man of worldly means who gave his life in service. I make these few remarks because we employ money as a means of trying to buy comfort, joy, peace, pleasure, happiness. We often feel that if we had plenty of money we would be happy. There are many people who have money and they are no happier than we are. The real philosopher is the happy man. He believes in a land of real values and desires. He sees the real worth of things and places events in their proper setting.

It has been said that the two greatest disturbing elements in the world today are money and home relationships. The greatest part of the tragedies and unhappiness of the world traces back to one or both of these two things. Everyone has a right to work, to earn, to spend, to save. It is not the amount that you make that makes you happy; it is the way you save and spend that makes you happy. The man that makes $100 per week and spends $105 is not nearly so happy or thrifty as the man who makes $20 and spends $15.

The absolute necessities of life are not so costly. The abnormal desires of society and abnormal desires for luxuries are expensive. I have often said that the difference between happiness and unhappiness from a financial viewpoint is the difference between putting our hand in our pocket and finding a dollar and finding a hole. Thrift begets self respect and self respect begets respect of others, and respect from others begets happiness. Lack of thrift begets loss of self respect, dependency, despair.

How do you spend your money? You don't know. You have a certain income, at the end of the week or month you have so much or you are in debt so much. Why? You do not know.

Did you ever make a budget? Did you ever keep a record of every nickel, or penny, or dollar you spent during a week or month? Did you ever look it over carefully to see how much of it was spent wisely and how much foolishly? Suppose you do that sometime and see if it has any lesson for you to learn. How much are you saving? How long can you hope to work in the mill? What will become of you when you are sick? What will become of you when you are no longer able to work? Who will take care of you? Will you become dependent upon relatives? Will you go to the poor farm of the county or city? Have you any right to enjoy life and protection of society, to have a job and earn, and then spend it all because you feel like spending it and then become a ward of the mill, your relatives, or the state? Don't you think you had better save a little

now? You make enough to save. Curb some of your foolish ambitions. Cut out some of the waste places in your economic life. Plan for another day when you may not be so fortunate as to have a job and be able to work. This means happiness, independence. It means living as this great Creator would have us live. Look well to this waste problem.

Another great waste is health. I believe it is every man's duty to be well or as well as possible. Through sin and the transgression of law by our ancestors, we may have inherited certain physical handicaps. We owe to ourselves, our friends, and our posterity, good sound healthy bodies. Ignorance is a curse. Through ignorance and indifference we assault our bodies and tear them to pieces until we are afflicted with a thousand maladies. Our eating, our sleeping, our ventilation, our dissipations are nearly all of such a nature that they destroy bodily growth rather than make it. We live in spite of the food we eat rather than because of the kind we eat. The soft drink parlors and myriad bottle drinks indicate the depravity of a once normal appetite.

The time, the method, the quantity and the quality of food are determining factors of health or disease. The greatest dissipation of this generation is found in its eating and drinking. This subject is too large and too ramifying in its divergences to try to give an exhaustive treatment. There are thousands of diseases which the race now has attacking it, and these have come through ignorance and indifference alone.

Health is one of the greatest blessings of life. It is a characteristic of the normal, sensible man. It is a demand placed upon us by Almighty God, and society, and unborn generations. Health produces wealth and independence. How is your health? What are you doing to make it better? Do you sleep enough? Do you have good ventilation in your room? Do you eat the proper kind of food? Is it properly cooked? Do you take daily exercise of the right kind? In what condition is your throat? How are your teeth, your ears, your eyes? Do you fill up on patent medicines or do you take the wholesome advice of a good physician? Look after your health. Stop reading patent medicine advertisements, and trying to doctor your own ills. Get healthy and happy. Stop wasting your health through ignorance and indifference.

Another waste place is the non-use of brains. Mental powers like physical powers will dwindle and dwarf and die from non-use. Several years ago I had the bones of my left limb broken. For six weeks I lay with it in a plaster cast. When they took the cast off the joints in my knee and ankle were stiff. Only six weeks were required to stiffen these joints. I wonder how long some people have had their brain in a plaster cast. What an effort it will be to arouse it and get it to function again. Its powers have all been wasted because of the non-use. Again, if it has been used, how has it been employed? In knocking, and nagging, in suspicion and deception? What have you been doing with it? Have you been filling it with trash and scum, or have you been loading it with the good and constructive things of life? The brain gives back in later years the things that we have put into it in early life. You will get back what you put in. If you put in trash, you will get back trash; if you put in nothing, you will get back nothing; if you put in valuable materials, you will get them back. How about wasting the powers of this chief distinguishing characteristic between man and beast? What do you read? What do you study? How do you spend your time, and energy, and money? All of these are answers as to how you use your brain.

Waste occurs in the making or not making of friendships. I am the pupil of the old school. I believe strongly in friendships. I believe in pure friendships with no ulterior motive involved, free from selfishness or personal advancement. The world is so busy now, and so changing, that many regard friendships of little value, hence they make no effort to have friends or keep them. Someone has said that business is "commercialized friendships." We deal with people because we like them or some one organization. We must have friends. The way to have friends is to be worthy of friends. To have friends we must be a friend. Cooperation, progress, civilization is resting upon the friendly attitude of the world toward certain people and principles. If we want to live we must live in the hearts of our fellow man; if we want to be big we must be big in the estimation of our fellows.

I was in one of the leading hotels of one of our southern cities a few years ago, when about noon everything stopped, the elevators, the waiters, all the activities. I asked someone what the trouble was. He replied, "Mr. ————, the president is being buried, and they stopped while his body dropped into Hades." I wonder how that president kept up his friendships. I wonder if he went through life on cold-blooded business principles, measuring men in money and counting lightly man's estimation of himself. The possession of friends is a privilege denied to no one who will pay the price.

Abou Ben Adem told the angel to write his name as one who loved his fellow man, and when the roll was read his name led all the rest.

Don't waste your friends or opportunities to make friends. Our friends are worth more than material possessions. They are the brotherhood of love and fellowship. There are many more wastes that could be discussed but I shall close with only one more—Opportunity.

One of the chief occupations of middle-aged men or old men is sitting around talking of the opportunities they had and failed to grasp them. Someone has described opportunity as having a long forelock, but bald in the rear. It must be caught as it comes to us, and can not be caught when it has passed.

A poet, some years ago, said it comes only once and if we fail to grasp it then, it is gone forever and failure is our lot. The late Judge Walter Malone, of Memphis, Tennessee, said that opportunity comes with every sunrise. Success awaits him who sees, and grasps, and makes his own. There are hundreds of opportunities presenting themselves to us daily. Ignorance, indifference, or lack of nerve, compels us to let them pass.

Ralph Parlette says, "There are a lot of big ideas floating around, why not get one?"

The world in which we live is filled with deviations and detours. It is filled with opiates of most alluring effects, it is filled with a glamor of golden deceptiveness. It is also a wonderful world, rich in real splendor and infinite values. It has untold wealth and unknown opportunities.

Waste dissipates our efforts and brings discouragement.

Ruskin said, "God buried the valuable things deep in the earth that those who would possess must dig deep for them." Study your deeper life. Look not upon the surface. The solution of all the problems of human ills is not on the surface.

Waste is the curse of the world. It saps our life, our health, our soul, our material wealth, our ambitions, and aspirations. It buries the weakling in oblivion.

Take stock of your outlets and stop the steady flow that drains success to dregs.

"He Lingery"

BY U. DODGE.

"Lady in de mill sent me a pair sump'n to press. Kin do plain an' fancy pants pressin' an' shoe shinin'. Ain't never tried no ladies' lingery. Howcome youall tell 'em I kin do Chinese work?"

"Hey? Say, listen here." The superintendent of the Whatsname Mill looked up from his desk as the office boy held a fragrant bundle of silk under his nose. "Don't you bother me now. That's no lady's clothes. That's a pair of silk pajamas I want you to press before I get away from here this afternoon. I'm going off to make a speech tomorrow at a textile convention on the subject of "Standardization of Textile Fabrics." I've got a good speech, too. I know it is because the man that wrote it for me says so. As I'll more than likely have to occupy a room at the hotel tonight with someone else, I want you to fix these up so I can wear them. I don't want anybody to have a chance to laugh at my lingerie."

Zach unrolled a bundle which billowed voluminously on a stray breeze. "If them's yourn you musta boughten 'em when you thought you was twins." He sniffed appreciatively. "Where you buy 'at langzhree smell?"

"Lingerie is not a smell. That's the same word you tried to use just now, but you got it wrong. That's high society stuff. It means things like that, but not quite so large for a person of my specifications. You never can tell when you buy the darn things how they are going to fit. See if you can't press those down a little and never mind the smell. That's the only pair of silk pajamas I own and every time I put them on I feel so stuck up I get to thinking I'm the queen of Sheba or a movie vamp and go and throw a lot of fancy smell-water on myself. Hurry up now, I'm leaving pretty soon."

Zach departed down the stairs. "Huh! White folks think a nigger caint read. Newspaper advertisements all say lingery. 'At's ladyfolk's clothes. This hyuh langzhree mus' be fuh men. Iron, git hot. Lingery is lingery, but he lingery is langzhree. Washerwoman mu's have a time gittin' 'em separate. Iron, git right. Anybody have to git up as soon as mill folks, got no time fuh such foolishness. Jist draw off dey pants an' flop in bed. 'At leave 'em in good shape fuh soon start in de mornin'. Draw on dey pants. Draw in three aiggs an' cuppa coffee. All fixed before high society kin swap dey langzhree fuh dey clothes."

True to his expectations, Mr. Tell got only half a room that night. A biggety bell boy ushered him to a cell in the far corner of which reposed a corpulent figure clad in bright red. "Gum in," he rumbled. "Make yourselff velgum. Diss iss my ped. Dass dere is yourss. I am Professor Hamberger for make a sspeech tomorrow to de league of Sociable Governments on de evolution off de industrial society in diss country. I haff a very fine sspeech. For t'ree year I t'ink up diss sspeech until it iss so fine I like to read it to you now iff you listen."

He extracted a bulky package from the rear pocket of his sleeping garment, and Mr. Tell ducked. "Not right now," he said. "I've got to go and get some supper. If your speech is the same color as your lingerie, I don't think I want to hear it, anyway. If you're as red as you look, you must be one of these bullshevik fellows. Wait until I eat a couple of steaks, and I'll argue with you."

"Ahhh," said the red bird, kissing his fingers at the ceiling. "Bullsheveek iss de only true government by de peoples dat hass yet so far—"

Mr. Tell slammed the door and hunted up a supper. After that he held a reunion with various friends and competitors until his eyes, refusing to stay unglued, forced him back to his rented cubicle and its red inmate. He donned his sleeping garments, and then, with a suspicious glance at his roommate who was regarding him with one eye half open, he put tomorrow's speech in the breast pocket of the jacket. He did not think the red professor would steal his money, and if he did he could borrow more, but he couldn't take any chances on that speech. Then, hit by a happy thought he opened the door and peered up and down the hall.

"Vot iss?" asked Hamberger.

"I'm going to take a swim," said Mr. Tell. "There's a pool down the hall and I'm hot. I'll be back soon."

"I go mitt," said the other and together they marched quietly to the door of the pool which they found reposing in the silence and darkness of midnight. Shedding their clothes, they plunged in. Suddenly there came a sound. A most unwelcome, embarrassing sound. A murmur of suppressed feminine voices and a low giggle. A party of ladies, infringing on Mr. Tell's bright idea was coming down the hall. The two men, clad in nothing but their innocence began a wild scramble out of the water in search of their clothes. The voices came nearer. Mr. Tell, groping madly in the darkness began to say, "Now I lay me," and the professor swore in six languages. A voice was heard wondering where the light switch was, there was a click, a flood of light, and a chorus of screams. A wet trail, plain enough for any detective to see, led from the pool to a room wherein two men, in wet garments hastily donned in the dark, pulled the sheets over their heads and pretended slumber.

Mr. Tell did not sleep well which was not surprising considering his wetness, the professor's snores, and his excitement over being a convention speaker. After a short nap he awoke to find daylight on the way and promptly decided he would sleep no more. A lifetime of early rising had accustomed him to dressing in the dark, and he quickly slipped on his clothes and went out for a walk, not noticing that he had put his clothes on over his pajamas. The professor snored on.

The convention convened. As attending sales men distributed gratuitous notebooks and pencils and the chairman

cracked a few preliminary jokes, Mr. Tell slapped himself madly on the chest and galloped back to the hotel where he searched his grip without results. His speech was gone. Either the bolshevik had stolen it, or it had found a watery grave in the swimming pool. He remembered putting it in the breast pocket of his pajamas and that he still had them on. But he couldn't find a breast pocket under his shirt, and he couldn't find them in his grip. He dragged sadly back to the convention hall where he found that the chairman had already announced his speech and everybody was looking for him.

He faced the audience with a sensation in his stomach he had not enjoyed since the last time he was called on at school to recite a lesson he did not know. "You'll have to excuse me," he said, "I don't feel well enough," and sat down. Something crinkled under him and he got up again, ran his hand down inside his pants bosom and extracted from the hip pocket of his lingerie a typewritten sheaf of papers.

"Here it is," he announced. "It's a darn good speech, too. I thought I'd lost it, but I had it in the wrong pocket. Everybody listen good now." He cleared his throat and began to read.

"The subject of this morning's talk is thus defined by Spencer. 'Evolution is an integration of matter and concommitant dissipation of motion; during which the matter passes from an indefinite, incoherent homogeneity to a definite, coherent heterogeneity; and during which the retained motion undergoes a parallel transformation.'"

Something was wrong. Upward of two hundred faces regarded him with expressions devoid of intelligence. He read it over and saw that the two front benches had all gone to sleep, while a couple of men on the next had begun to divide a sandwich between them by taking alternate bites from opposite sides. Someone in the rear yawned audibly and said, "As if anybody cared."

Mr. Tell got mad. He threw the speech into a handy waste basket and swung his fists. "That's a bum speech," he proclaimed, "and I didn't write it, but about this standardization business there's a whole lot to be said. It has been said that the extent of civilization to which a country has attained can well be measured by the amount of soap which it uses. I know that this is so, because I know a lot of uncivilized folks.

"Since we have all become more or less accustomed to soap, however, a higher test of civilization would be the degree of standardization which we have reached in measurement and production. In the far dawn of civilization when man, groping through the ages toward a community life, needed nothing for his existence but a few simple garments of skin and a few equally simple implements of the chase wherewith to obtain them, he was ignorant alike of standardiaztion and soap. There was no standardization because there was no need for it. There was no soap, but not for the same reason.

"As time passed on and man moved with it, life became more complicated. A pair of pants was no longer the rabbit skin with which the baby bunting had been wrapped until the old man took a fancy to it. A pair of pants became a standard article of commerce, and a necessary adjunct for the enjoyment of polite society. A woman's skirt was something designed to shield her alike from the weather and casual observation. Standardization had begun to disseminate its inestimable benefits, and one person looked much like another, at least from the outside.

"But that was as far as it went. Inside, folks still felt different, which was due to original sin or something like that. With the further advance of civilization, proponents of the standardization idea hope that everybody will feel alike inside as well as look alike outside, and it is my opinion that it won't take us long at the rate we are going to produce this result. Anybody who doubts it can notice the universal prevalence of short pants, short hair, cigarettes, swear words, wrist watches, walking sticks and political offices. I won't say anything about one piece bathing suits as there is not enough of that subject to use any of it without exposing some family skeletons.

"Just exactly what is going to happen when one person can't tell himself from the rest of the crowd has puzzled me a good deal. The only advantage that I can see in it is that when a man gets into police court for soaking his mother-in-law on the jaw, he can claim that he thought he was hitting himself. There are probably other advantages that I can't think of just now, but I'm in favor of it on general principles. Mills will be a whole lot easier to run when all the help are alike.

"At present, however, we are far from being standardized completely. The trouble is that while we have invented a lot of standards, we are going to have to go to work now, and standardize them. We have made standards of length, strength, weight, heat and many other things including a standard of intelligence which may come handy some time. So far there has never been any use for it. But a lot of them differ, one from the other in different countries, and they will all have to be brought together. It's slow work, but we are making progress. Just lately we have made great strides under the leadership of Mr. Herbert Hoover, the Secretary of Commerce. He has been cooperating with different manufacturers, and has really accomplished wonderful results. I think I can safely say that he has been instrumental in standardizing some fifty-odd articles of manufacture which have been greatly benefited thereby.

"One of the first subjects for standardization which Mr. Hoover put through, in connection with paving brick manufacturers' associations, was the standardiaztion of bricks, wherein they reduced the number of paving brick sizes from fifty-five to eleven, and one year later the associations met and voluntarily reduced that number to seven. This, of course makes the standardized brick cheaper for the individual manufacturer, an economy which they have naturally passed on to the customer. From the standpoint of the poor boob who got hit in the head with a paving brick, I don't imagine it would make a great deal of difference to him whether it was a nine and three-eighths or a nine and seven-sixteenths brick. It would feel about the same either way, but that illustrates what I am talking about.

"Naturally, the thing of most interest to us along this line would be the standardization of textile fabrics. As the man said about the weather, much has been said about this, but very little has been done. The day that all styles of fabrics are listed into certain set constructions, the burdens of a lot of mill men will be lightened considerably. It will at least eliminate the inventive customer who expects to make a killing with some odd construction of his own devising, and who blames the mill when it fails. Such an arrangement will doubtless work a hardship for some of us,

but in the end it will be beneficial. Standard prices would automatically follow standard fabrics, based, presumably, on the cost of cotton. With the passing of the inventive customer, would also go the unholy profit which occasionally attends him, and with all the mills brought to a common level of design and excellence, it would be a case of 'Shoot, Luke, or give up the gun,' with a few gunless Lukes looking for jobs on the police force. The most of us would tighten up our belts and make the grade, just as we always have.

"But before Mr. Hoover gets around to us, I wish he would take a whack or two at the folks who take the cloth we make and whittle it up into garments. They call themselves cutters-up, and they sure are. It's the cutting-upest business I know of, and the most in need of some sort of standardization. I haven't much kick to make on the regular garment makers and their more or less weird styles. They do very well. The underwear folks are pretty bad, but passable. What I want regulated good and hard is the unclassifiable guy who makes something that is neither clothes nor underwear—pajamas.

"Pajamas originated back in the days when women wore their under unmentionables so long that they showed below their skirts. When the fashions changed, they found they had a lot of long garments left over they didn't know what to do with. The outcome was that the strongminded wives made their husbands sleep in them so as to put them to some use, and the rest of the men adopted the idea to keep the henpecks from feeling too badly about it. When the women found they had started a new fashion for the men, they had to wear them too, to keep up. The consequence is that we have a garment which is neither masculine nor ferminine and not standardized in color, material, fit, or any other way. You buy one pair and the coat is long and the pants short. The next pair is the other way around. One has a pocket in the northwest corner of the jacket, the other's pocket is in the southeast corner of the pants. The coat has so many frogs around the button holes, you never can get the button through, and the pants pull together with a string like a laundry sack. I am in favor—"

From without there arose the sound of trampling feet and a bellow of rage. Mr. Hamberger burst through the door. Sssnake!" he hissed. "You haff my grreat sspeech ge-stole. Last night in de bath we haff exchange de undervear, yess. De pajamas, I don't care, but de sspeech, vere iss?"

Mr. Tell pointed to the waste basket and the bolshevik fished his precious document out and covered it with kisses. "Ahhh, child off my brain. I get up to make de grrand sspeech, and what do I find? A lot of foolishness about de standardization off cloth. Bah! Standardization iss all wrong. Dass iss vat make de rrotten governments. Ve got too much standardization now. Look at diss country. De government iss rrotten. De whole country iss rrotten. De bullsehveek iss de only good t'ing—"

Whop! Mr. Tell's fist scored a bull's eye on Mr. Hamberger's left optic. One more punch like that, and the red gentleman would have been converted into something that looked a whole lot like his namesake, but he ducked and beat it. The super chased him to the street and would have inflicted more punishment, but he was stopped by a boy with a telegram. It was a message from the president of the mill telling him to come right back, and it left him with three minutes to catch the train and three dozen anathemas on the heads of mill presidents who couldn't let a hard working superintendent enjoy himself for one day. He climbed over the back end of the rear coach as it was pulling out and collapsed on a seat in the smoker.

With the conductor keeping an eye open for smoking flappers who might interrupt his privacy, the super managed to change a suit of his own underwear for the red pajamas, which he presented to the office boy upon his arrival at the mill, together with half a bottle of perfumery. "Take these," he told him, "and throw them away. I'm off that foolishness for the rest of my life." The president came galloping down stairs at the sound of his voice, waving a sheet of paper.

"Watt, my boy," he shouted, "congratulate me. We've landed a big contract that will last us all the summer. I thought we might have to shut down some, but now we'll have to hustle to keep up. I was so excited when the contract came in, I had to send for you to help celebrate. Hooray! Hooroo!"

He waved the paper in the air and danced about. Mr. Tell extended a hand. "Let's see what it is before you get too pepped up. Maybe it's something you don't want."

"The very thing I've been trying to get onto for years," yelped the old man. "It's pajama checks—here, what's the matter? Zach! Come here, quick."

Mr. Tell groaned, sat down on his chair, and then slid from the chair to the floor. The president wrung his hands and called for Zach who bounded up the stairs from the basement, dragged his boss under the ice water cooler, adjusted the faucet so that the water would run slowly onto his face and left him there to soak.

"Ain't nothin' but a faint," he informed the president on his way back down the stairs. "Ice water bring him 'round." He adjusted a cracked glass against the wall, donned his newly acquired pajamas and viewed the result with admiration. "Sweet spirit, hear my prayer an' look. He lingery shore is too good to waste layin' up in bed wif. Cain't nobody see it." He dosed the top of his head with the contents of the perfume bottle, rubbed it in and flapped his hands. "Twilight water, spread around. Git myse'f j'ined to de Mount Zion Cornet Band, an' use dis fuh a uniform. Time dey see de fancy doin's on de front of dis jecket, I gets elected drum major. Next parade, high brown gals say 'Watch dat nigger. Ain't he hateful? Look like a nickel's wuth strawberry ice cream wif a prune on top. Smell like a dime's wuth de Promised Land.' Hot skillet!"

Under the trade name of "Dropfo," a vise that is made entirely of drop forgings, excepting only the handle, is now on the market. Each part is machined to be interchangeable with the same part on any other vise of the same size. The jaw plates are knurled and forged under the hammer and doweled onto the jaw. Thus it is possible to replace the jaw plates, which are subject to wear.

The Dropfo vise is light in weight, it is made with a swivel base and wedge lock that is quick to set and automatic in tightening up, and it is also made in the stationary type.

Each vise is sold under a full and unconditional guarantee on each part excepting jaw plates. The vise is manufactured by The Fulton Drop Forge Company of Canal Fulton, Ohio.

A Study of Gum Tragacanth

BY G. E. VAN TROMP GOVIER.

Gum Tragacanth occurs in the juices of several varieties of shrub-like plants, of the species *Astragalus*, which are indigenous to the Near East.

They are especially common to Asia Minor, and in the mountainous regions of Armenia, Kurdistan, Persia and Syria. Two varieties are quite common in the Balkans—Greece, parts of Bulgaria, and Crete, while a variety is found in Nubia, in North Eastern Africa. It is stated that it is to be found in South Western Europe also.

The gum tragacanth of commerce is produced mainly in the previously mentioned Asiatic countries.

Method of Collection.

The gum will spontaneously exude from the stems of the shrubs at certain periods of the year, but the yield is low, and the quality of this naturally exuded gum is very inferior to that produced artificially. It is in the form of knots and lumps, and usually of a dark red hue. It is, however, collected, and used in mixing with the inferior commercial varieties.

The artificially produced gum is collected during the months of July and August, when the natives remove all the foliage from the shrubs, and make different types of incisions in the trunk, according to the variety of gum it is desired to produce. Small circular incisions produce thin strips, or "vermicelli" or "thread" tragacanth. The longitudinal incisions yield leaf tragacanth, while irregular indiscriminate cutting on the trunk produces knoblike lumps, which are usually dark in color, and of comparatively little value.

The climatic conditions during the collection of the gum determine to a great extent the value of the product. After the incisions are made, and the gum commences to flow it dries spontaneously, and takes approximately a week before it is ready to be gathered. Should the weather be good during this period a very high grade gum can be obtained, which is of good color and free from foreign matter, and which is known as the "white leaf tragacanth." However, if there are wind or rain storms during the flowing of the juice, and the drying of the gum, dust and foreign matter are deposited on the surface of the congealing product, and it darkens in color, and is consequently of a lower grade. The most important center for the collection and grading of the gum is Smyrna, which is the chief seaport of Asia Minor. From there it is convenient to export it to the various western countries who make use of it industrially.

Varieties.

Apparently two distinct varieties of tragacanth are produced in Asia Minor, namely, *Astragalus versus, Oliv.* and *Astragalus gummifer, Lab.* These appear in the Turkish trade as Smyrna and Syrian tragacanth, the former being selected "leaf" gum, white in color, and the latter being selected "leaf" gum of a darker hue—yellow—and containing a small amount of impurity. There are also three other varieties, or grades, in the Turkish trade, known as Angora tragacanth (1st Grade), Kurdistan tragacanth (2nd Grade) and Trebezonde tragacanth (3rd or poorest grade). They are made up from selected gums from all producing localities.

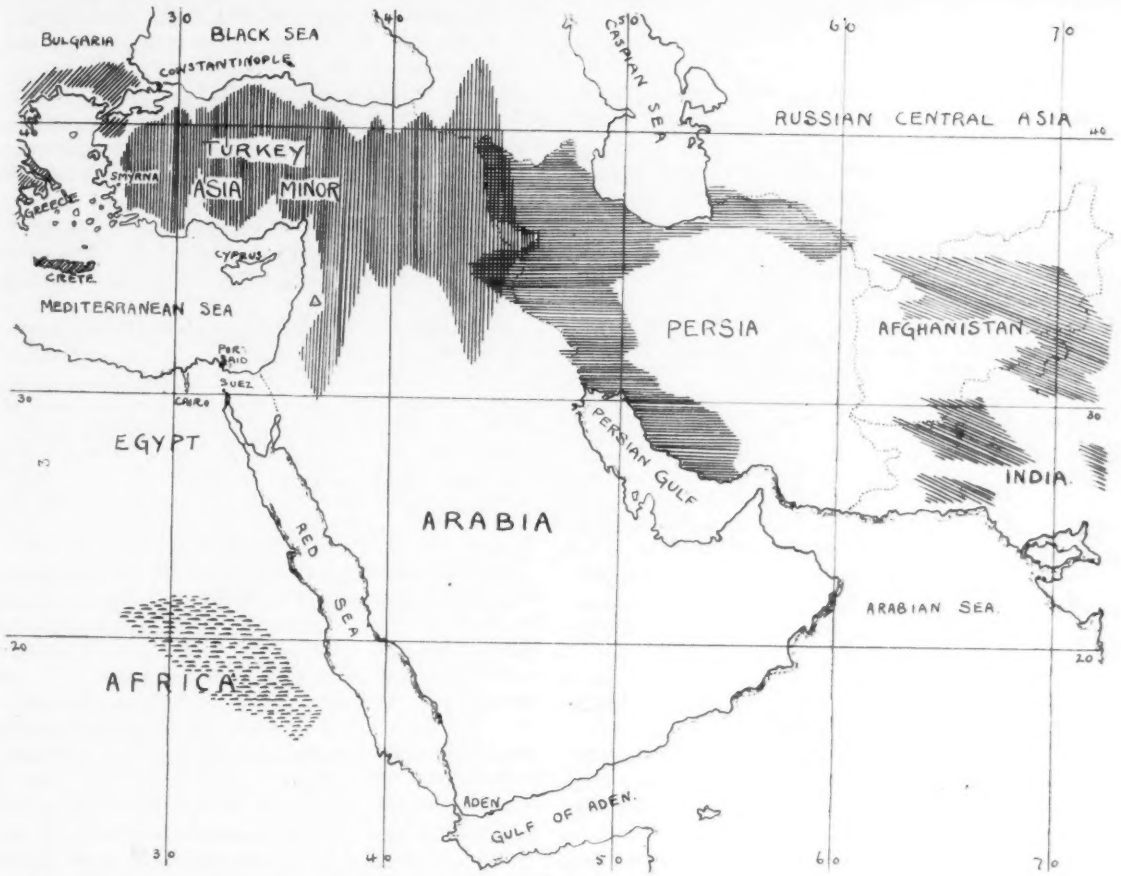
Persia produces a number of gums which are sometimes known as Persian tragacanth, or hogg gum tragacanth. These gums are usually in the form of large nodular or stick-like masses, larger than Turkish tragacanth, and very insoluble. Often they are used to adulterate the Turkish gums. Other names for the Persian gums are Bassora gum, Kuteera gum, and Caramania gum, while the Persians know them as "Arrehbor." They are said to be derived from almond and plum trees. Persian gums and their solutions in water are intermediate in character between those of true tragacanth and gum arabic. (Imp. Inst. Rep.)

A small decidious tree, the *Cochlospermum Gossypium D.C.*, in India produces a gum which is sold largely in India as a substitute for tragacanth, and some of the gum is stated to be exported as Indian gum, Karaigum, Hindu gum and Kadaya gum. Another specie of shrub, the *Sterculia urens, Roxb.*, yields a gum which is similar, and is also sold as Indian gum. The true name for this latter gum is "Karaigum," while the name for the gum produced from the former, *Cochlospermum Gossypium D.C.*, is Hindu gum. Yet another shrub produces a gum similar to tragacanth in India, the *Sterculia vilosa, Roxb.*, the product from which is known as Maura gum.

SOME VARIETIES OF GUM TRAGACANTH WITH COMMERCIAL NAMES AND ORIGIN.

COUNTRY OF ORIGIN	SPECIE OF SHRUB OR TREE	COMMERCIAL NAMES OF GUM
AFGHANISTAN..	Cochlospermum gossypium DC.	
	Astragalus parnassii Boiss	
AFRICA.....	Sterculia Tragacantha Lind.	African Tragacanth.
ANTILEBANON..	Radix carniolae.	Nourtoak Root.
		Smyrna Tragacanth.
		Syrian Tragacanth.
		Angora Tragacanth (Best Grade)
	Astragalus versus Oliv.	
ASIA MINOR....	Astragalus gummifer Lab.	Kurdistan Tragacanth (2nd Best).
		Trebezonde Tragacanth (Poorest).
GREECE AND CRETE.....	Astragalus ereticus Lam.	
	Astragalus parnassii Boiss	Anatolian Tragacanth.
INDIA.....	Cochlospermum gossypium DC.	Indian Gum—Hindu Gum.
	Sterculia urens Roxb.	Karaigum. Kadaya Gum.
	Sterculia vilosa Roxb.	Maura Gum.
PERSIA.....		Arrehbor.
		Bassora Gum.
		Kuteera Gum.
		Caramania Gum.
		Hogg Gum Tragacanth.
TROPICAL AMERICA.....	Anacardium occidentale Linn.	Cashew Gum.

African tragacanth, obtained from *Sterculia Tragacantha, Lindl.*, is gathered in tropical western Africa, from Senegambia to the Congo. It forms very irregular rough lumps, or cavernous stalactitic masses that are either colorless or tinted yellow, and are opaque, excepting if in very thin leaves. Another variety of tragacanth obtained in Africa (Nubia) is gathered from *Astragalus pernassii Bois*, which also grows in Greece and Crete. The latter is a very



Map of Southwestern Asia Illustrating the Localities in Which the Various Species of Gum Tragacanth are Found.

Greek Tragacanth.

Turkish Tragacanth.

Bassora Gum.
Hogg Gum Tragacanth.
Kuteera Tragacanth.
Caramania Tragacanth.
Arrehbor.
Persian Tragacanth.

Nourtoak Root.

African Tragacanth.
Indian Tragacanth.

Indian Gum.
Karaigum.
Hindu Gum.
Karaya Gum.
Kadaya Gum.
Maura Gum.

good variety of tragacanth.

The tragacanth obtained in Greece and Crete, and other Balkan States is of the *Astragalus ereticus, Lam.*, and *Astragalus parnassii, Boiss.*, variety. They are sometimes referred to as Anatolian tragacanth; these two species of shrubs are two of the three varieties which have actually been identified as the source of tragacanth.

In Afghanistan the *Cochlospermum gossypium, D.C.* supplies Hindu gum, similar to the Indian variety. In Antilebanon a substitute for tragacanth is found in the shape of "Nourtoak Root" (*Radix carniolae*), which in its native surroundings is used powdered as a food and drug. (Arch. Chem. Mikros. 9, 69-77). Cashew gum is an exudation of the *Anacardium occidentale, Linn.*, a small tree indigenous to tropical America, and is similar in some characteristics to gum tragacanth.

Characteristics.

As previously mentioned, the shape of the fragments of gum tragacanth vary according to the method by which it has been produced. The lumps may be either filamentous, foliaceous, or irregular nodules. Each variety is extremely horny, and very tough, and it is possible to shave thin slices from portions by cutting. It is very difficult to pulverize. This distinguishes gum tragacanth from the insoluble cerasin gums. In appearance it is dull, and slightly transparent. It is not as hard a gum as acacia or cherry gums. The finest varieties of tragacanth are those which are of white color, or slightly tinted yellow, and of a foliaceous character. The inferior varieties are darker in color, varying from dark yellow to red, brown and black. The white varieties have an insipid mucilaginous taste, while the darker varieties are most unpleasant, with an acid flavor. When soaked in water it has great absorption powers, taking up as much as fifty times its own weight of water. One portion of the gum dissolves, and the other merely swells, the result being a heavy mucilage.

Chemical Characteristics.

Gums in general are a class of substances present in the juices of plant life, which have little or no taste, are non-volatile, cannot be crystallized, and are entirely colloidal. Their purification is most difficult, and but little is known of their chemical relationships.

When tragacanth is treated with water, one portion of the gum dissolves, and the larger portion merely swells and absorbs large quantities of water. This latter is variously termed traganthin, adraganthin, and bassorin. The latter term is more used. The soluble portion is termed arabin. It is present to the extent of eight or ten per cent, although Polleyn states that analyses have shown tragacanth to contain as much as 50 per cent of soluble gum. However, about ten per cent is a maximum average.

The soluble gum may be separated from the insoluble by diffusion. Gum tragacanth can be rendered completely soluble by treatment with alkalis, but the color of the solution is considerably darkened. Caustic soda turns the solution a deep yellow.

RESULTS OF ANALYSIS OF GUM TRAGACANTH

Moisture	10.88%	13.62%	16.22%	15.44%
Starch	3.11%	2.79%		
Cellulose	3.98%			3.85%
Ash	2.81%	3.02%	2.44%	2.76%
Calcium Carbonate	1.46%	1.08%	1.37%	1.41%
Bassorin	70.96%			
Arabin	9.19%			
Galactose		17.88%		21.49%
Arabinose		33.09%		38.23%

The soluble portion of the gum is adhesive, in fact, it has similar adhesive qualities to gum Arabic. The insoluble portion of tragacanth has no adhesive qualities whatsoever. Nevertheless, it is stated to have good binding qualities when dry.

Apart from the soluble and insoluble constituents of tragacanth, there is also present a certain amount of starch, cellulose, sugar, coloring matter, mineral matter, and a bitter substance soluble in alcohol. The proportion of the soluble gum to the insoluble gum varies according to the extent of the chemical metamorphosis of the tissue during the production of the tragacanth. The greater the per cent of soluble gum present, the more extensive the chemical metamorphosis has been, for the soluble gum is very probably formed from the insoluble. Correspondingly, as the amount of soluble gum increases, so the amount of cellulose and starch decreases, and the finer grades of tragacanth only contain a very small quantity of these substances. The poorer grades contain larger quantities of cellulose and starch, and react very intensely with iodine. When the gum contains a high per cent of soluble gum, it is almost brittle, though very difficult to pulverize, and the corresponding gum, when high in insoluble gum is particularly tough, and it is practically impossible to pulverize it. Drying tragacanth anhydrous facilitates powdering it. The ash of tragacanth is chiefly composed of calcium carbonate.

After hydrolysis of three samples of white tragacanth, Widtsoe and Tol'ens (Ber. 33.132) obtained fucose and arabinose, while fucose and zylose were obtained from two samples of brown tragacanth.

Investigations into the composition of gum tragacanth were carried out by O'Sullivan and he found that like Gedda gum, it was a mixture of several gum acids. He states that it can be separated into a group of acids which remain in solution in dilute alcohol, and an insoluble portion, bassorin. He found that the acids of the soluble group were built up on a nucleus acid, very similar if not identical with geddic acid, by its combination with galactose and arabinose residues. He did not completely work out the constitution of the insoluble portion, but it yields a nucleus acid of the formula $C_{14}H_{26}O_{23}$, to which, the name bassoric acid is given, and also intermediate acids formed of basoric acid united to the residues of xylose, and of a new pentose sugar, tragacanthose.

Indian gum tragacanth has the property of slowly evolving acetic acid when exposed to moist air, a property also possessed by Karaigum (*Sterculia Urens, Roxb*) (Burbourt, Pharm. J. 15, 57.)

Hindu gum (*Cochlospermum gossypium D.C.*) contains a stable acid, gondic acid, $C_{22}H_{36}O_{21}$. It was obtained in the same manner as the arabic and geddic acids were obtained by O'Sullivan. When hydrolised the gum yields 18 per cent of acetic acid calculated on the dry and ash-free substance, and is thus an acetyl derivative. Xylose and a hexose are among the other products (Robinson, Chem. Soc. Trans. 89, 1496).

Uses of Gum Tragacanth.

It is used extensively in the manufacture of textile fabrics. In the process of warp sizing it is often added to the starch size mixture as an agglutinant, and a weighting agent. When used in this manner a three per cent solution is commonly used. The gum is steeped in water for 48 hours, and is then vigorously boiled with an open steam jet. Care has to be taken to see that perfect solution has been obtained, for the gum is extremely difficult to properly paste, and small lumps of insoluble matter remain in suspension, which, if deposited on the warps, will rapidly cause mildewing. About 15 pounds of this three per cent solution are added to each 100 pounds of starch in the size mixture. Often the value of tragacanth as an agglutinant is questioned. Undoubtedly it is *not* an economical gum to use for this purpose, as its value as an adhesive is very small. Only between eight and ten per cent of the gum is soluble, and this is the portion that has the adhesive qualities. A further disadvantage in the use of tragacanth in sizing is that it forms a very favorable medium for mildew growth, and when it is used, strict precautionary measures against trouble in this direction must be observed. Before use, the solution should be very carefully strained.

Remarks on the value of gum tragacanth as a sizing ingredient by some of the writers on the subject of sizing are as follows:

"After being dissolved in water the solution must be carefully strained from any small lumps that have failed properly to gelatinize and dissolve. Any such particles left in the size will cause trouble by sticking to the yarn and the rollers. They may also give rise to the local development of mildew. Gum tragacanth is not much used for sizing (in England). Its cost is high and the preparation difficult, also the feel produced on the cloth does not find favor among manufacturers." (W. F. A. Ermen, in "The Materials Used in Sizing.")

"Gum tragacanth is not often used in sizing although some manufacturers believe they get some special advantage by using it. If the matter were considered carefully, the authors feel certain that gum tragacanth would disappear from sizing altogether. In mixings where it is used the amount of *actual gum* is infinitesimal, and what possible

good results can be expected from this small quantity is beyond the understanding of the authors. Another objection to the use of Gum Tragacanth is its price, and when it is known that its properties can be imitated to a great extent by mixtures of starch and dextrin it will be seen how expensive a substance it really is. The solution of gum tragacanth before use should be passed through a very fine sieve in order to remove minute particles of ungelatinized gum. If this process be not carried out there is a danger of these particles of the gum sticking to the yarn in the form of flattened discs, or else they are left adhering to the roller on the tape frame. There is danger of these particles of gum developing mildew, on account of not having become impregnated with the proper amount of preservative." (Percy Bean in "The Chemistry and Practice of Sizing.")

"Gum tragacanth possesses good binding properties which impart both body and stability to the yarn without harshness, and it does not impair the purity or color of dyed yarn, but it tends readily to decompose and develop mildew." (H. Nisbet in "Theory of Sizing.")

Gum tragacanth is also used to some extent in finishing mixtures, where it is added to augment starch as an adhesive. In this respect the same remarks regarding its use as a sizing ingredient are applicable.

In dyeing it is used as a thickening agent for the dye bath. This tragacanth thickening is made six per cent strength, of which about 15 gallons are used to each 200 gallons of dye solution.

It is similarly used as a thickening agent in calico printing.

Yet another use for it in connection with the textile industry is in the manufacture of sizing compounds. Here its chief use is as an adulterant. While it might be argued that it is included in a sizing compound as an adhesive for the size mixture, a moment's reflection will suffice to enable anyone to realize that the amount that could be included in a compound is such that by the time it is diluted in the size mixture it is as good as lost. There is not sufficient present to function helpfully in the sizing process. The real function of the gum tragacanth in a sizing compound is to take up large quantities of water, and to give the compound "body" in spite of a high moisture content. Where compounds are used which contain gum tragacanth, it should be carefully examined for small specks of insoluble gum, which will cause mildew, and damage to the cloth.

Other uses for gum tragacanth are for medicinal purposes, and in the preparation of hair lotions. G. Pegurier (Rep. Pharm. 1912, 246) gives directions for the preparation of the glycerate of gum tragacanth for use as a lubricant for instruments in surgical operations.

An extract of gum tragacanth is used as a protective colloid for colloidal chemical investigations. The preparation of this extract is difficult since only a relatively small part of the solid gum tragacanth is soluble in water, and it can only be partially separated from the swollen "Bassorin." A method of preparing this extract is as follows: Rub 10 grammes of powdered tragacanth with 15 to 20 cubic centimeters of absolute alcohol, and mix quickly while stirring with one liter of warm water saturated with carbon tetrachloride (whereupon the mass quickly swells to a thick paste), add one liter of water saturated with carbon tetrachloride and allow to stand two days with frequent stirring. Filter repeatedly through four thicknesses of gauze, allow to stand several days, filter through glass wool and gauze, and dialyze. (Killoid-Z. 18, 141-52.)

A use for the leaves, wood and bark of the African tragacanth is suggested [Bull. Imp. Inst. 17, 281-9 (1919)] in that they contain considerable quantities of potash. The leaves of the African tragacanth contained 12.26 per cent of potassium oxide on the ash basis. The ash of the wood and bark contained 18.5 per cent potassium oxide. This could be used on soils deficient in lime.

The Analysis of Gum Tragacanth.

Methods of examination. A representative sample of the gum to be examined is taken and it is pulverized, and stored in a stoppered bottle.

Determination of moisture. Ten grammes of the powdered sample are weighed into a small porcelain weighing dish, and dried at 105 degrees Centigrade until a constant weight is obtained. The loss in weight is noted, and the moisture content calculated. The moisture contents vary from 9 to 18 per cent.

Determination of ash. 20 grammes of the powdered sample are weighed into a platinum dish and carefully heated while covered with the lid. When all volatile matter has been removed the lid can be removed and the platinum dish transferred to a muffle furnace, where it is heated to a dull red heat until all combustible matter has been destroyed. At this time the dish containing the ash can be cooled and weighed. The percentage can be calculated.

The ash content varies from 2 to 3.5 per cent.

Examination of the ash. The ash can be examined for mineral constituents by the usual qualitative methods. In that the ash usually contains large quantities of calcium carbonate, it may be desirable to determine the exact amount present. To do this, a portion of the ash should be dissolved by adding a small quantity of distilled water followed by dilute hydrochloric acid. The solution should be heated to boiling, and the insoluble residue removed by filtration. To the filtrate a slight excess of ammonium hydrate solution should be added, finally adding a boiling solution of ammonium oxalate in moderate excess. There will be a finely divided precipitate of calcium oxalate which will take 24 hours to completely settle. The solution should be filtered, and the precipitate in the filter paper washed with hot water until the last drops of the washing-water no longer indicate chlorides with silver nitrate. The precipitated calcium oxalate is then converted into carbonate by incinerating carefully in a platinum crucible, allowing to cool, adding a few drops of strong ammonium carbonate solution, re-incinerating, and finally weighing. The quantity of calcium carbonate present can be calculated. The variances are from 1.0 to 1.5 per cent calculated on the weight of the gum before ashing.

Starch. Starch can be detected in gum tragacanth microscopically. If it be desired to determine the quantity present, a solution of the weighed gum may be made, and acidified with hydrochloric acid. It is boiled for 15 or 20 hours on the water bath, the loss by evaporation being constantly made up. Finally the starch present in the gum will be converted into glucose. It can be directly determined by means of Fehling's solution, as outlined in Sutton's "Volumetric Analysis." The amount of starch present may be from 2 to 4 per cent.

Determination of gum in tragacanth. Cover 0.3 to 0.4

grammes of the powdered sample in a strong test-tube with about 10 grammes of cuoxam (23 to 25 per cent NH_3 saturated with metallic copper), stir until the lumps are broken. Almost fill the tube with cuoxam and allow to stand with occasional stirring for half a day. Allow to settle, pour supernatant liquid through a Gooch crucible, and extract the residue three times for two hour periods with cuoxam until the filtrate gives up cloudiness in five minutes when diluted with three volumes of ethyl alcohol. Transfer residue to crucible and wash with ethyl alcohol and ether, dry at 110-120 degrees. Gum tragacanth remains, while most other gums are dissolved. The results are slightly high on account of some combination of the gum with the cuoxam. (Otto Frey, Vienna. Pharm. Post., 46, 812-3.)

Detection of Gum Arabic in Tragacanth. (1) Twenty cubic centimeters of the gum solution are placed in a Nessler tube, an equal volume of pyramidone reagent (2 grammes of pyramidone in 50 cc of water) is added, and then a few drops of 12 volume hydrogen peroxide. The solution is shaken vigorously, and in five to thirty minutes there develops a violet blue coloration, which is best seen against a white background. The test will detect an addition of five per cent of gum arabic. [Institut Pasteur. Ann. fals. 13,489 (1920).]

(2) Advantage is taken of the fact that gum tragacanth contains no active oxidase such as is present in gum arabic. A cold aqueous solution, 1 in 30 of the gum, is treated with an equal volume of a one per cent aqueous solution of guaicol; one drop of hydrogen peroxide solution is then added and the mixture shaken. In the presence of the gum arabic the liquid rapidly acquires a brown tint, while with pure gum tragacanth it remains colorless. (Payet, Ann. Chem. Anal. 1905, 10, 63.)

Comparative viscosity. The comparative viscosity of the liquid can be ascertained by making a solution of 10 grammes of the gum in a little warm water, diluting to 100 ces. Gums may be compared this way, and the rate at which 100 ces of the solutions flow through a fine orifice on a glass funnel drawn out to a fine point can be noted.

Detection of Indian Gum in Tragacanth.

(1) The amount of volatile acids developed by genuine samples of gum tragacanth on one hand, and Indian gum on the other is sufficiently constant to serve as a criterion for estimating the purity of either, alone or in admixture, the volatile acidity of the latter being nearly 7.5 times as great as that of the former. (W. O. Emery, Dept. Agr. Bur. Chem., Circ. 94.)

(2) Indian gum can be readily detected as it forms a nearly transparent jelly with water, giving no blue color with iodine, and a clear pink solution on boiling with hydrochloric acid, in every way totally unlike gum tragacanth. In admixtures it may be detected by the stringy mixture produced with borax, by the presence of characteristic stobe cells, and by the amount of volatile acid evolved when treated with mineral acid. (H. C. Fuller, Am. J. Pharm. 84, 156-8.)

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Southern textile men will be interested in the recent announcement that the American Cellulose & Chemical Manufacturing Co., Ltd., manufacturers of "Celanese," has opened a southern office at 1116 Johnston Building, Charlotte, N. C. This step, the company states, is in line with its policy of placing its facilities and products more completely at the service of southern mills.

The office is in charge of Todd B. Meisenheimer, who is widely known throughout the industry. With this office, and its large plant at Amcelle, near Cumberland, Maryland, the company states that it may properly be regarded as essentially a southern industry. Although "Celanese" and the S. R. A. dyes have been used in this country for several years, it was not until the early months of 1925 that the company began domestic production at its Amcelle plant, where rapid strides are being made toward full production capacity.

The characteristics of "Celanese" yarn, it is stated, include strength and elasticity, lustrous beauty and silken "feel," giving it a wide adaptability and usefulness in the production of every sort of high-grade fabric from chiffon to elaborate draperies. The manufacturers are in a position, it is pointed out, to deliver "Celanese" wound direct on 5-inch weaving cops, eliminating a process at the mill. The material also is impervious to water, and has a high tensile strength as well as an elasticity and uniformity of size and quality, it is stated; also the cross-dyeing possibilities when used in combination with other yarns is pointed out as a distinctive feature.

Towels and Toweling

BY T. WOODHOUSE AND A. BRAND.

Terry toweling is very commonly embellished by the introduction of more or less elaborately colored stripes as well as by the use of simple or complicated end or cross borders, with or without the employment of colored filling.

A typical example of a striped fabric of a simple nature is reproduced at S, Fig. 93. This fabric is very similar to that illustrated at Q, Fig. 92. The weave is identical, i.e., the cloth is a regular 3-pick terry, while it is also made from 2-fold cotton yarns, both warp and filling.

The stripe proper is in the exact center of the fabric,

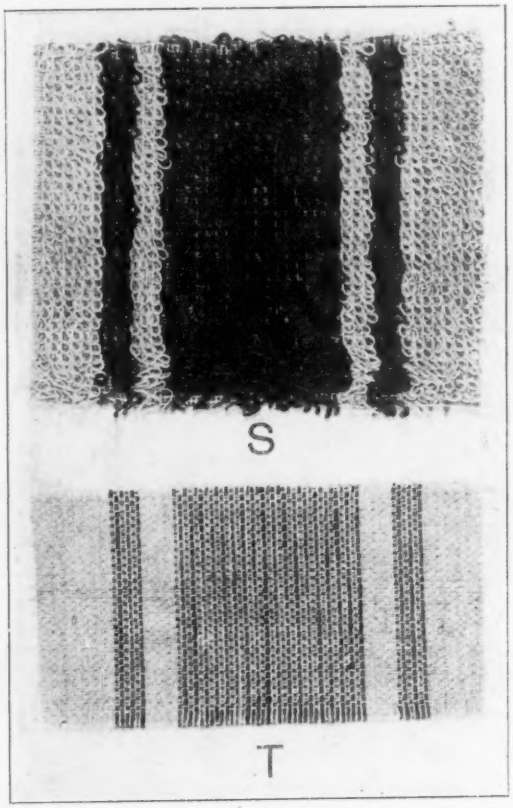

FIG. 93.

and runs from end to end of the complete towel since it is formed entirely from 2-fold Turkey red cotton warp threads. The warp is set 52 threads per inch, hence the order of the complete warp in a 24-inch-wide fabric would be as under:

PILE	White	270		12		12		270
	Turkey Red		12		36		12	
GROUND	White	270	12	12	36	12	12	270

It will be understood, of course, that the threads are drawn through the reed, 1 pile thread and 1 ground thread alternately, and reeded 2 threads per split (1 ground and 1 pile thread in each split). Occasionally the ends are reeded 4 in a split, in which case there would naturally be 2 ground threads and 2 pile threads in each split.

It is sometimes recommended to arrange the warp in alternate pairs of threads, that is to say, the warp is drawn through the harnesses and through the reed 2 pile threads and 2 ground threads alternately, in which case each pair of similar threads is passed through the same opening of the reed. This method is supposed to result in the formation of a more regular pile, but it is questionable whether such a desirable condition obtains with this order of reeding. One undoubted advantage which does accrue is the absence of many weaving faults due to the improved shedding which results from this method of reeding.

A brief examination of the 3-pick terry weave shows that the two ground threads in each repeat are cutting threads, while the two pile threads in each repeat are also cutting threads; in other words, the threads of each respective pair work oppositely to one another. Each split of the reed thus contains a pair of similarly tensioned threads. When the 1 and 1 method of drawing and reeding is employed, the highly tensioned ground warp thread has a tendency to interfere with the free movement of the lightly tensioned pile warp thread, and faulty sheds sometimes result from this interference.

A further practical point of importance in the weaving of terry fabrics is in the arrangement of the pile and ground warps which is sometimes adopted in order to nullify the effects of contraction or shrinkage in the width.

It is a well known fact that practically all fabrics contract more or less in width and length from the original width in the reed and the original laid length of the warp. As regards the shrinkage in width, this occurs in greatest degree near to the selvages, irrespective of the distance of the temples from the fell of the cloth. It is evident, then, that the inward pull of the warp threads will result in the threads bearing hard on the outer sides of the reed wires, that is to say, at the inner sides of the spaces between the reed wires.

If a terry fabric is drawn in the order 1 pile, 1 ground, in each split of the reed, the pile thread at the left-hand selvage will be quite free to move, while the corresponding ground thread will be rubbing against the reed wire. On the other hand, at the right-hand selvage, the pile thread will be rubbing against the reed wire, while the ground thread will be relatively free. It is evident that it would be advantageous to the formation of clear free sheds if the lightly tensioned pile threads are similarly free to move near both selvages. This result can be secured—or partly secured—by reversing the order of the warps in the right-hand half of the fabric, so that the pile thread of each pair in each split is always nearer to the selvage than the accompanying ground thread. Hence the order is 1 pile, 1 ground, from the left-hand selvage to the middle of the fabric, and 1 ground, 1 pile, from the middle of the fabric to the right-hand selvage.

In the weaving of the heavier classes of terry fabrics, particularly linen Turkish toweling, it is a good and fairly common practice to employ double reeds. A double reed may be likened to a pair of ordinary reeds set one behind

the other, with a narrow space, ⅛ inch to ¼ inch between their inner surfaces. The reed wires of the back section are set exactly opposite the middle of the spaces between the reed wires of the front section and vice-versa. The whole forms a reed of exactly twice the sett of the individual reeds composing it. The greater depth of the compound reed from back to front gives it additional stiffness and rigidity for beating up the filling in heavy fabrics, while the double reed itself secures better spacing of the warp threads.

Reverting to Fig. 93, it should be stated that the end border (or "heading," as it is sometimes termed) of the sample S is formed in exactly the same manner as R, Fig. 92, namely by throwing the terry motion out of action, applying additional tension to the pile warp (making the tension similar to that of the ground warp), and interweaving in the ordinary manner. The cloth thus produced is shown at T, Fig. 93.

In many textile fabrics, the production of perfect selvages is a comparatively simple matter. On the other hand, there are many fabrics which require special treatment and apparatus to enable satisfactory selvages to be formed. Terry fabrics belong to this latter class.

It is impossible to obtain a suitable selvage by using ground warp threads drawn through the ground harnesses only. (It need hardly be stated that the pile warp threads

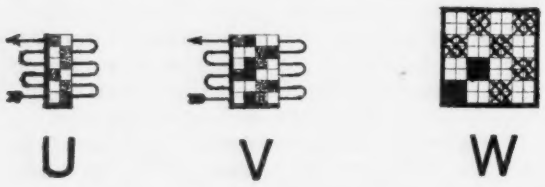

FIG. 94.

cannot be used for selvage purposes.) This is evident from a consideration of the design U, Fig. 94, which show two different ground threads and six successive picks. By following the arrow-headed line, representing the filling at the selvages, it is evident that the filling would return in the same shed twice in each group of six picks, and once from each selvage.

An imperfect, but sufficiently satisfactory, selvage can be obtained by drawing multiples of four ground threads on all four harnesses (two for the ground and two for the pile). This is shown by the design V, Fig. 94, where the arrow-headed line again represents the filling at each selvage.

In many cases it is found more satisfactory to introduce special skeleton harnesses to control special selvage threads carried on the ground warp beam. These are usually arranged to interweave in 4-thread, 4-pick regular basket or hopsack order; four complete units (or repeats) of this weave are given at W, Fig. 94, for ready reference.

Although, as already indicated, it is quite possible to reproduce a 3-pick terry fabric in a loom with the aid of four harnesses only, nevertheless, in actual practice, it is almost invariably woven with five harnesses. Particularly is this the case where cross-bordered fabrics are manufactured, as the additional harness, while it slightly complicates the draft, gives additional facilities for variation in the design of the end border.

Fig. 95 has been prepared specially to present in one illustration a large amount of information relative to the designs, drafts and weaving plans of different forms of the 3-pick terry weave. Design E, Fig. 95, is typical of the ordinary method of weaving 3-pick terry, with the warp arranged 1 thread pile, 1 thread ground, on the left-hand half of the fabric, and with this order altered to 1 thread ground, 1 thread pile, for the right-hand half. The first 16 threads represent the first order, and the second 16 threads represent the second order; in each half the pile threads are indicated by solid black squares while the ground threads are distinguished by stippled squares. The

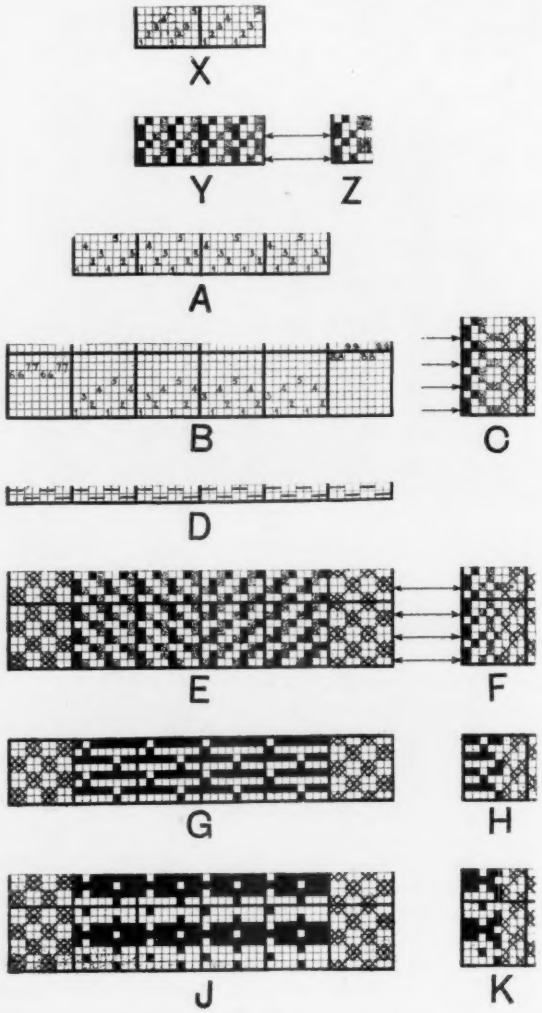

FIG. 95.

selvage threads, 8 at each side, are marked in crosses, and interweave in 4-thread hopsack order, as delineated in W, Fig. 94. The weaving plan for design E is given at F, Fig. 95; the arrow-headed lines connecting the 1st, 4th, 7th, and 10th picks of the design to the corresponding picks of the weaving plan, indicate the "fast" picks. The remainder of the picks are naturally "loose" ones.

The order of reeding is illustrated graphically at D, Fig. 95; 1 pile and 1 ground thread are drawn through each split or dent of the reed.

The draft corresponding to the weaving plan F is that

shown at B, Fig. 95. In this draft B, it will be observed that the 3rd and 5th harnesses control only half the number of threads carried by the remaining three harnesses. Harnesses 3 and 5 must, therefore, be knitted only half the sett of harnesses 1, 2 and 4. In many factories it is the practice to arrange for these coarser sett harnesses to occupy the back position (farthest from the reed), and when this is the case, the draft—for the terry portion only—is altered to that shown at A, Fig. 95. Drafts A and B may thus be regarded as alternatives.

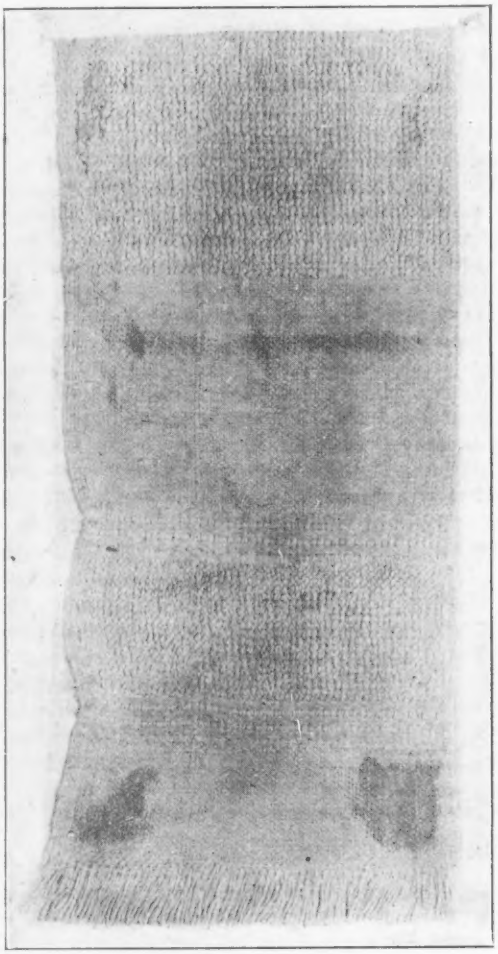

FIG. 96.

Weaving plan C, Fig. 95, is a rearrangement of weaving plan F, to make it correspond to the alternative draft A. Both weaving plans, C and F, require 12 picks to complete one round or one repeat. This number is necessitated by there being different numbers of picks in the repeats respectively of the 3-pick terry and the 4-pick hopsack weave. The number 12 is the least common multiple of numbers 3 and 4, and is therefore the lowest number of picks that contains an integral number of repeats or units of each of the weaves.

When the 2 pile, 2 ground, order of drawing the warp threads is adopted, the design is altered to that shown at Y, Fig. 95. The draft over 5 harnesses then becomes identical with X, Fig. 95, and Z is the corresponding weaving plan.

In all the drafts shown in Fig. 95, the pile threads are drawn on the two front harnesses, while the ground threads are on the three back harnesses. This is the usual method adopted in practice, as the fact of the loosely-tensioned pile threads being on the harnesses nearest to the reed facilitates the formation of clear, free sheds for the passage of the shuttle.

Two typical weaves for cross-border or end-border purposes appear at G and J, Fig. 95. The corresponding weaving plans are shown at H and K respectively in the same figure. Both weaving plans H and K are arranged to suit the draft indicated at B.

The following particulars are taken from a typical example of union cross-bordered terry toweling, the border of which contains a portion woven with the design J, Fig. 95. The sett of the warp is 55 threads per inch in the reed, while there are 35 picks per inch in the terry portion, and 55 picks per inch in the plain border portion. The warp is 25s lea linen yarn, both pile and ground, while the filling is 14s cotton. The cross-border, between the end of the terry proper and the beginning of the fringe, is approximately 5 inches long and is made up as follows:

18 picks of single Turkey red cotton filling, using weave J, Fig. 95. 1¼ inch (approximately) of ordinary cloth, similar to that shown at T, Fig. 93, woven with the ordinary filling, with the reed moving to its full forward position every pick, and with both pile and ground warps similarly tensioned.

30 picks of heavy twist cotton filling, using weave J.
18 picks of single Turkey-red filling, using weave J.
24 picks of heavy twist cotton filling, using weave J.
18 picks of single Turkey-red filling, using weave J.
30 picks of heavy twist cotton filling, using weave J.
1¼ inch (approximately) of ordinary cloth, as above described.

A further typical example of a cross-bordered terry towel is illustrated in Fig. 96. This fabric is wholly produced from cotton yarns. The weave is the regular 3-pick terry; there are about 40 picks per inch and 60 threads per inch. The filling is single cotton, about 16s count; the ground warp is similar to the filling, but with a greater degree of twist, while the pile warp is heavier (i.e., thicker) than the ground warp, and is about 12s count.

The total length of the end border is about 5½ inches, and, considering the fabric from the bottom to the top, is made up as follows:

2¼ inches (approximately) of ordinary cloth, as above described.
12 picks of heavy cotton twist, using weave J, Fig. 95.
1⅜ inch (approximately) of 3-pick terry, similar to the body of the fabric.
12 picks of heavy cotton twist, using weave J.
2¼ inch (approximately) of ordinary cloth, as above described.
The beginning of the main part or body of the cloth.

The complete fringe in Fig. 96 is not shown. There is a selvage at the left-hand side of this sample: note the distortion produced by the picks of heavy cotton twist.

(To be continued.)

Machine Calico Printing

BY WILLIAM B. NANSON.

Logwood is still one of the most important dyestuffs we have. The reason for this is that none of the artificial blacks to which we are accustomed can equal all the purposes for which logwood can be used. It is true that aniline black has taken the place largely of logwood black, but it cannot be printed with other colors as well as logwood can, and therefore logwood still plays an important part in steam printed styles. Aside from its use as a black it is not a reliable color to use; if used in mixtures it fades quickly, and many compound colors where it has been used as a mixture have transformed completely, after a short exposure to light, and for greys, violets, and blues with any of the ordinary mordants such as iron, chromium, tin, copper and aluminum mordants it is altogether out-of-date.

In ordinary steam styles chromium is usually the mordant preferred in actual practice. It is not only better in itself than an iron black with logwood, but it is not so liable to injure the colors printed with it, though it requires careful working to prevent this from happening. It has been found beyond a peradventure of a doubt that iron black will not print well with pinks or basic colors, and Alizarine reds, though these have entered into all, or nearly all, steam styles; therefore chromium is used for all except special purposes, in place of iron for blacks.

The great tendency which chrome-dyed logwood blacks have to green is overcome by the addition of a little alizarine to the color. This forms, with the chrome mordant, a claret, and the blue tone which they sometimes possess is corrected by the addition of a yellow coloring matter, Persian berries or Quercitron bark. A good black is made for printing as follows:

BLACK L

150 grams Starch
100 grams British Gum
400 grams Water
60 grams Acetic Acid
25 grams Alizarine 20 per cent
30 grams Quercitron Bark extract 48 degrees Tw.
135 grams Logwood extract 48 degrees Tw.
Boil and add
16 grams Chlorate of soda
Cool and add
6 grams Potassium ferrocyanide (finely ground)
130 grams Nitrate acetate of chrome 38 degrees Tw.
40 grams Acetate of lime 23 degrees Tw.

1000

Print and steam as usual, then wash and open soap. The chlorate of soda and the yellow prussiate of potash are of great assistance in developing the black; this they do by oxidizing the logwood during the process of steaming.

It is quite possible to use Hematein, a dry extract of logwood, or Hemolin, which is similar, instead of logwood; either is much stronger than logwood extract, and must be used accordingly.

A logwood black that is known as Carmine Black or a Fast Steam Black is only a reduced logwood containing the essential mordant. This is made by precipitating logwood with bichromate of soda, the black lake that is thus produced by the precipitated logwood is then dissolved in bisulphite of soda. The necessary thickening paste and the printing color made from the solution are then mixed thus:

4 kilos Starch paste or tragacanth thickening.
1 kilo Fast Steam Black.

This color works well on "blotches" as it does not scum like the ordinary logwood black, and it does not "stick in" quite so badly.

Catechu.

Many of the dyestuffs of the present day have, to a great extent, taken the place of catechu, but it is still largely used in calico printing for steam browns, and drabs where great fastness to light, acids, soaps, and alkalis is desired, and also in the madder dyed style for getting browns in combination with red, purple and chocolate.

The mordant chiefly used for Catechu is acetate of chrome, but it is possible to use other mordants if the color wants modifying. For instance, aluminum gives a yellow brown; and iron salts have a greenish effect, while lime salts give a dull shade of red brown and chromium mordants give a fine fawn or dark warm drab, though in all cases where Catechu is used it is found that a small proportion of a catalizing or an oxidizing agent is necessary to fully develop the catechu colors; either a small proportion of sodium chlorate or a copper salt will do.

Solutions of Catechu had better be thickened with British gum or gum Senegal; it is much better to use starch as it gives a much stronger shade, but it is very likely to gelatinize with standing, and the resultant color is uneven and "blebby" when it is printed. This disadvantage can be overcome somewhat by the addition of tragacanth and oil, but it is better to use gums as the foregoing, when blotches or large patterns are to be printed into Catechu browns.

The following colors have been printed successfully:

CATECHU BROWN I (Warm Chestnut Shade)

750 grams 10 per cent Catechu solution (see below)
100 grams Starch
70 grams Gum tragacanth 6 per cent
20 grams Cottonseed oil
20 grams Sodium chlorate
Boil, cool and add
40 grams Acetate of chrome 32 degrees Tw.

1000

To prepare the 10 per cent Catechu solution:

100 grams Catechu in cubes
450 grams Acetic acid 9 degrees Tw.
450 grams Water
Boil until the Catechu is dissolved and then make up to 1000 grams with acetic acid at 9 degrees Tw.

CATECHU BROWN II (Warm Drab Shade)

600 grams 10 per cent Catechu solution
240 grams British gum
100 grams Water
Boil and add
20 grams Sodium Chlorate
Cool and add
30 grams Acetate of chrome 30 degrees Tw.
20 grams Acetate of lime 23 degrees Tw.

1010 (boil to 1000)

CATECHU DRAB.

600 grams 10 per cent Catechu solution
230 grams British gum
100 grams Water

Boil and add
20 grams Sodium chlorate
Cool and add
25 grams Actate of Chrome 30 degrees Tw.
15 grams Acetate of lime 23 degrees Tw.
10 grams Potassium ferrocyanide (finely ground)

1000

CATECHU BROWN III

600 grams 10 per cent Catechu solution
240 grams British gum
90 grams Water
Boil, cool and add
30 grams Nitrate of copper 80 degrees Tw.
30 grams Acetate of chrome 30 degrees Tw.
20 grams Acetate of lime 23 degrees Tw.

1000

In the foregoing the colors may be printed on oiled or unoiled cloth and then steamed at natural pressure and then soaped. Acetate of copper may be used instead of the nitrate and the colors may be fixed in any of the foregoing recipes by the use of boiling ½ per cent solution of sodium bichromate, or if any lead yellow has to be developed.

A species of oxidation appears to cause the Catechu to fix itself upon the cloth in all of the foregoing recipes, and although the shades may not appear very dark, they are quite fast, so much so that they are able to resist the operations of "dunging" and dyeing in the madder or Alizarine style, and therefore appear frequently in combinations involving these colors. They may be made much darker and the oxidation may be completed by running them through a solution of bichromate of potash, or soda.

The Basic Colors.

It is found that the basic colors consist of salts of mostly colorless organic bases. Though most of these salts in solution are highly colored they are found incapable of dyeing cotton fibers with any degree of permanence, therefore the base has got to be precipitated upon them in some insoluble form. Tannic acid has been found the most useful for this purpose, because it forms color lakes with the cloth and color, and thus forms insoluble salts with the different color bases. These tannates of the color bases are, however, to some extent, soluble in water, more especially if they are precipitated in the presence of the excess of tannic or some other acid; therefore, in this case, they are not quite fast colors. Free tannic acid is not, however, necessary to the formation of insoluble color lakes. It is found that the insoluble metallic tannates of antimony, tin, aluminum, and iron are equally capable of combining with organic color bases and yield compounds which are highly colored and are quite insoluble to water and soap. Therefore it is upon this invaluable property of metallic tannates that the use of the basic colors in printing is based.

Some mixture of the coloring matter, the thickening, the tannic acid, and the organic acid, is printed on the cloth, the organic acid being added to prevent the precipitation of the dyestuff.

The goods are then dried and steamed. During the course of the steaming the dyestuff and the tannin are combined and make together a soluble lake, this is rendered totally insoluble in passing through a bath of tartar emetic and chalk. The chalk is only intended to neutralize the acid nature of the bath; this acidity is due to the abstraction of the antimony by the tannic acid, and the production of the acid tartrate of potash. The insoluble double tartrate of antimony and the coloring matter is thus produced in this way and is permanently attached to the fiber.

The usual method of making up a basic color printing paste is to add a solution of the dyestuff to a previously prepared thickening; then add the necessary amount of acetic or tartaric acid, and finally the tannic acid solution. Of course the tannic acid is of varying proportions and depends entirely on the quantity of dyestuff employed; if there is any doubt about the quantity to be used, it is easy to try it by making a few printing trials with it; as a rule it takes about three of tannic acid to one of dyestuff, but this must be only taken as a basis for experiment.

The following are taken from recipes in actual practice, and may be regarded as reasonably correct, although I guarantee nothing.

METHYLENE BLUE.

200 grams 10 per cent solution of Methylene Blue N
600 grams Thick starch paste, acid
100 grams Tragacanth paste 5 per cent
100 grams Tannic acid solution 50 per cent

1000

METHYLENE BLUE (10 per cent solution).

100 grams New Methylene Blue N
250 grams Acetic acid solution 9 degrees Tw.
50 grams Tartaric acid
600 grams Water

1000

AURAMINE YELLOW.

140 grams Starch
50 grams British gum
452 grams Water
10 grams Tartaric acid
Boil, cool a little and add
20 grams Auramine (concentrated)
50 grams Acetic acid 9 degrees Tw.
30 grams Cottonseed oil
Cool and add
250 grams Tannic acid solution 50 per cent

1000

It happens that some brands of Auramine yellow are reduced to 20 per cent pure color by the addition of dextrin, and these require only a little more than their own weight of tannin to fix them.

RHODAMINE PINK.

{10 grams Rhodamine 6G 100 per cent
{50 grams Acetic acid 9 degrees Tw.
10 grams Tartaric acid
100 grams Water
600 grams Starch paste
200 grams Tannin solution 50 per cent

1000

METHYL VIOLET (blue shade).

{25 grams Methyl Violet B extra (B.A.S.F.)
{60 grams Acetic acid 9 degrees Tw.
{60 grams Water
{10 grams Tartaric acid
715 grams Starch paste
130 grams Tannin solution 50 per cent

1000

The shades that are red are prepared just the same. Three and four per cent of glycerine is added occasionally to assist the solution of the dyestuff.

BRILLIANT GREEN.

{ 20 grams Brilliant Green
{130 grams Acetic acid 9 degrees Tw.

70 grams Water
660 grams Starch paste
120 grams Tannin solution 50 per cent

1000

The Induline Blues are largely used for dark navy blotches and need to have a special usage as they are not easily dissolved in ordinary solvents; for this reason, unless they are prepared in a certain way, they are quite likely to produce uneven work. Powder is best used for printing Induline R and B brands, and therefore must be made up as follows:

INDULINE R (for printing).

20 grams Induline R powder
60 grams Ethytartaric acid 20 degrees Tw.
40 grams Acetin
50 grams Water
Dissolve and add
80 grams Acetic acid 9 degrees Tw.
600 grams Acid starch paste
150 grams Tannin solution 50 per cent

1000

After the goods are printed and steamed, all basic colors must be fixed in the following bath: 20 grams tartar emetic; 10 grams chalk; 970 grams water.

A beautiful greenish shade of blue is got from Turquoise Blue G.G. (Bayer); it is dyed the same as Methylene Blue.

It is unnecessary to say that these basic colors will mix and are so mixed together in different proportions to form any kind of compound shades. These shades are restricted in practice to quite bright colors, oranges, greens, violets, etc., as it is difficult, owing to the brightness of the standard colors, to get the ordinary every-day shades of fawns, modes, greys, etc., always alike. The smallest excess of pure color alters the whole compound and as the common shades are easily affected they are generally got from less pure effects or colors.

One or two of these recipes are shown and will serve as all basic colors used as such. If they are combined with mordant dyestuffs a different method is pursued. For instance, a Myrtle Green is got as follows:

MYRTLE GREEN.

100 grams Starch
290 grams Water
200 grams Tragacanth 5 per cent
120 grams Persian Berries 48 degrees Tw.
40 grams Logwood extract 48 degrees Tw.
Boil and add
20 grams Diamond Green (B.A.S.F.)
100 grams Acetic acid 9 degrees Tw.
Cool and add
90 grams Acetate of Chrome 25 degrees Tw.
40 grams Tannin solution 50 per cent

1000

It will be noticed that a very small amount of tannin solution is used in this case; this is due to the fact that the Persian Berry acts as a good mordant for all the basic colors; the most of the Alizarine colors act in the same way.

Most of the basic colors form insoluble compounds with arsenite of alumina and may be fixed in this way. Before the discovery of the lakes formed with tannic acid it was the only method known; on account of the poisonous character of its compositions it was barred in most countries, though it is still used to some degree in America and England. The arsenic in it is in an insoluble form and the danger of injurious consequences arising from its wear or from its contact exists only in the minds of non-technical legislators whom we are ever pleased to send to Congress.

The following is the general (arsenic) formula used for preparing basic colors for printing:

RHODAMINE PINK.

10 grams Rhodamine 6G
50 grams Acetic acid 9 degrees Tw.
100 grams Water
750 grams Alumina paste
90 grams Arsenic standard

1000

ALUMINA PASTE.

60 grams Flour
60 grams Starch
850 grams "Red liquor" (acetate of alumina) 8 deg. Tw.
30 grams Cottonseed oil

1000
Boil and cool.

ARSENIC STANDARD (1)

150 grams Arsenious acid (As_2O_3)
850 grams Glycerine

1000
Heat until dissolved. Or:

ARSENIC STANDARD (2)

150 grams Arsenious acid
150 grams Borax
700 grams Water

1000

Print on either oiled or unoiled cloth, steam, wash and and lightly soap. Of course the fastest and the brightest colors are got on cloth that is oiled. It has been found that the oil acts as a fixing agent for the alumina and it also acts as a mordant for the coloring matter. While steaming, the oil and the alumina and the arsenious acid form by their combination an insoluble precipitate of oil and arsenious acid, and that this precipitate forms an insoluble lake in turn with the color base.

The Alumina lakes of the basic colors are better looking and more brilliant in appearance than the tannin antimony lakes, but they are of inferior fastness, and they are only used in such places, as brilliancy is the first requisite rather than fastness. The basic colors may be fixed by albumen, but this mode is rarely used unless it is to modify the color or shade in pigment colors or in the zinc process of resisting aniline black. These basic colors also act with the same mordant as mordant colors and are sometimes added to them to brighten them up or in other ways modify them.

Among the "fast steam colors" the basic colors fixed with tannic acid are the most brilliant, as a class, that the calico printer can handle but as regards fastness they cannot come near to the "mordant" colors, though there are members of the basic group that leave little to be desired in this respect. They (the basic colors) do, however, render it possible to get colors that could not be secured any other way and they allow of an enormous range of colors in which the red, green, blue, violet and grey can be mixed together to form an infinite variety of the tertiary colors; and if one takes into mind the ease of application, their great tinctorial strength, their variety and adaptability to many styles, it will be found that the basic colors are of the first importance in calico printing.

The Use of Pigment or "Albumen" Colors.

These colors are applied to the goods in an already

(*Continued on page* 1126.)

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What the Southern Mills are Doing

The Sand Springs Cotton Mills, at Sand Springs, Oklahoma, have been purchased by the C. R. Miller Manufacturing Co., of Dallas, Texas, which now operates mills at Waco, Dallas and McKinney. The capital stock of the organization has been increased to $6,000,000, and, it is reported, a bleachery will be erected at Sand Springs, and equipment also installed for raw stock dyeing, these projects to cost approximately $425,000.

Report is to the effect that a second cotton mill for Jacksonville, Florida, is to be projected, to be known as the Hashba Textile Mills, and operated by B. H. Hamilton and others, who also plan the Brown Textile Mills Co., which anticipates the erection of a 20,000-spindle mill at Ratcliffe. The newer concern, it is stated, will build a 21,760-spindle mill on the Jacksonville side of Dinsmore.

Among the improvements being carried out at the Hawkinsville Cotton Mills, Hawkinsville, Ga., are installation of a new 330-hp. engine, 2,000 spindles, twenty-four 90-inch looms, and 48 motors.

Ten three-room houses have been added to the village of the spinning mill of the Danville Knitting Mills, at Bon Air, Ala., where a new office is also being erected.

A 2,000-spindle mill is projected by the Boaz Cotton Mill Co., Boaz, Ala. The mill building is 65x140 feet. E. F. Whitman is president.

Dale Cotton Mills, Ozark, Ala., have been organized by C. A. O'Neal and sons, Carl L. and Max L. O'Neal. The new company will operate the Ozark Cotton Mills, which it recently purchased. It is understood looms will be added to the present spinning equipment.

A plant to manufacture absorbent cotton is planned for Laurens, S. C., according to L. C. Barksdale, secretary of the Laurens Business League.

Negotiations are under way between citizens of Columbianna, Ala., and the Holcombe Stroud Textile Co., of Birmingham, Ala., for the location of a 10,000-spindle cotton mill at Columbianna.

A 100x125-foot addition will be built to the Tifton Cotton Mills, Tifton, Ga., contract having been let. Additional machinery for manufacturing will be installed.

Gastonia Weaving Co., Gastonia, N. C., will, it is understood, install additional looms.

A one-story brick building is being erected by the Highland Cotton Mills, High Point, N. C.

A large number of dwellings for operatives will be constructed at the new Borden Mills, Inc., Kingsport, Tenn., it is announced.

The addition being erected by the Echota Cotton Mills, Calhoun, Ga., is 84 x 77 feet, and will be used as a warper and slasher room. The structure will be one-story, with basement, of slow burning construction with steel sash windows, cast iron columns and monitor roof. J. E. Sirrine & Company, engineers, Greenville, S. C., prepared the plans.

The Tombigbee Cotton Mills, Columbus, Mississippi, are replacing plain looms with Nordray 16-harness dobby looms, secured from the Hopedale Manufacturing Company, Milford, Mass.

Fifteen new houses for employees are under construction at the village of the Alexander Manufacturing Company, Forest City, N. C.

Crystal Springs Bleachery Company, Chickamauga, Ga., have secured, from the Textile-Finishing Machinery Company, a piece goods mercerizing range consisting of the mercerizing padder, mercerizing tenter frame and washer. All of these three machines, which are of the latest types, will be run in range.

Rhodhiss Mills No. 1, Rhodhiss, N. C., are replacing plain looms with Nordray automatic looms, this being the fourth installment for this mill of looms supplied by the Hopedale Manufacturing Company.

Textile-Finishing Machinery Company are furnishing the Standard-Coosa-Thatcher Company, Chattanooga, Tenn., one of their latest type warp mercerizing machines, together with complementary equipment consisting of the winders for winding the warps, the boiling-out machine and coilers and folders for handling the warps between the processes. The American Yarn & Processing Company, Mt. Holly, N. C., is securing the warp mercerizing machine only from the Textile-Finishing Machinery Company, while the Belmont Processing Company, Belmont, N. C., has ordered practically the same equipment as that of the Standard-Coosa-Thatcher Company, with the exception that traverse folders are being supplied instead of coilers.

Bemis Brothers Bag Company, St. Louis and Boston, are installing 300 Nordray looms, made by the Hopedale Manufacturing Company, in their cotton mill at Bemis, Tennessee.

An addition to the plant of the Rhyne-Houser Manufacturing Company, Cherryville, N. C., is planned, the proposal having been approved by the stockholders. It is anticipated that 5,000 spindles will be added in the near future, but that buildings will be constructed with a view to further additions later on.

The Belk Manufacturing Company, Ellenboro, N. C., which was recently organized, will erect a mill building, one story, 80x200 feet, together with a warehouse and fifteen homes for operatives.

Balfour Mills, Balfour, N. C., have purchased machinery for the addition of 5,000 spinning spindles and 100 high speed Nordray looms. Additional floor space will not be required as this addition was contemplated when the mill was built. Twenty-five new houses will be added to the village to take care of the increased number of operatives. J. E. Sirrine & Company, Greenville, S. C., are preparing the plans.

The Dixie Cotton Mills, LaGrange, Ga., installed a large Finnel system of electric scrubbing recently. The South Texas Cotton Mills, Brenham, Texas, also have installed this equipment.

Southern Mercerizisg Company, Tryon, N. C., have let contracts for an expansion to their plant which will include the construction of a building and the installation of additional equipment for processing their product, mercerized single yarns.

Work of doubling the Kershaw Cotton Mills, Kershaw, S. C., is nearing completion. Additional contracts have been placed for a new power house, opener room, and warehouses, and work on them is under way. Contracts have also been awarded as follows: humidifying equipment, Parks-Cramer Co., Charlotte; heating and sprinkling, Grinnell Company, North Charlotte; lighting, Michael & Bivens,

These Manufacturers Have Proved It Profitable

These are just a few of the many textile manufacturers who use the up-to-date methods described below:

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Chas. H. Bacon Co.
Ipswich Mills
Sterling Hosiery Co.
Westminster Knitting Co.
Edson-Moore Co.
Johnson-Boyd Co.
Melville Shoe Corp.
Schneider, Battinus & Simon.

At first, They scoffed.... but now experience has earned for it the endorsement of the industry

IN A few years the sentiment of the entire industry has changed. A few years ago most textile manufacturers scoffed at the very idea of trademarking their goods. To pay attention to the manner of trademarking or the result, seemed ridiculous.

Then came an institution with a better method of trade-marking—the Kaumagraph Company. It maintained that if a textile manufacturer is proud of his goods he should put his trademark on it. If he wants to protect his customers, he should use his trademark along the selvage or as an end stamp. If he wants to increase his business, trademarking is an excellent economical way to advertise.

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At first only here and there did any manufacturer begin to trademark. But the results startled the industry! The Kaumagraphed goods pleased old customers; actually attracted new customers. Within a few years, other manufacturers began to realize that they were overlooking a business bet. You know the result—today it is hard to find a textile manufacturer who doesn't trademark his goods with Kaumagraphs.

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Gastonia; shafting, hangers, etc., Golden's Foundry & Machine Co., Columbus, Ga.

Corriher Mills, Landis, N. C., have purchased 725 horsepower of individual ball bearing textile motors from Fairbanks, Morse & Co., Charlotte, N. C., for driving the machinery to be installed in the new mill which is being erected under the supervision of George C. Bell, engineer, Charlotte.

Fairbanks, Morse & Company also made the following installations or have the contracts: Cochran Cotton Mills Co., for Hawkinsville plant, twenty-five 1½-hp., 1,200 r.p.m. ball bearing motors, totally enclosed, for application to Stafford looms; Pepperton Cotton Mills, Jackson, Ga., complete equipment for the electrification of the mill, including 750 horsepower of ball bearing textile motors; and Henry River Mfg. Co., Henry River, N. C., 36 7½-hp. individual ball bearing spinning frame motors.

The capacity of the new Mexia Textile Mills, at Mexia, Texas, will be doubled immediately, it is reported, and 25 additional homes for employees will be erected.

Georgia Webbing & Tape Co., manufacturers of webbing, auto transmission bands, and spinning and twister tape, Columbus, Ga., have let contract to The Grinnell Company covering the installation of a complete sprinkler system for fire protection in their mill building which was completed a year ago.

The New England Mill Situation.

Current news reports concerning conditions in the manufacturing centers of New England may easily be read as indicating a rapid decay of enterprise and investment in textile lines. But the statements of some recent speakers at various centers outside of New England are true only to the extent that they show what every manufacturer has known for years—that the restrictive legislation, high taxation, and lack of general public interest in mills, in New England were causing conditions clearly prophesied at legislative hearings in the states for fully a generation.

Recent happenings that show the trend of affairs include news that the Amoskeag Company of New Hampshire is spending some of its large cash reserves in acquiring other plants, such as the Parkhill of Fitchburg, Mass., and the Hamilton of Lowell, and they will be operated in future as parts of the Amoskeag Company, a new operating organization. They also include news that the Troy Cotton and Woolen Manufactory of Fall River, a corporation one hundred years old, is negotiating the sale of its very fair print cloth machinery to a corporation to be organized and operated in Alabama. Another Fall River mill, name not yet made public, is also negotiating with other southern interests to ship its machinery South, and presumably to replace coarse yarn machinery or equip plants now being organized. These latter events are in line with the transfer to Kingsport, Tenn., of about 90,000 spindles and other equipment of the Fall River Iron Works mills of the American Printing Company to equip a new set of buildings erected in the past few months.

Another case is that of the Thorndike Mills at Thorndike, Mass. This mill manufactures bed ticking and hickory striped cloth, and for sometime has been unable to run on full time. The treasurer recently called a stockholders' meeting at which he expected to present a suggestion that the manufacturing operations should be centralized at the plant at West Warren which is controlled by the same interests. The treasurer's recommendation further indicated the intention of the organization to remove a portion of their machinery to the West Warren plant and other machinery and equipment, not adapted to the processes in mind, was then to be sold for cash or stock to some southern plant where it could be run to better advantage because of local conditions in that section. At the time of going to press this stockholders' meeting had not as yet been held and the results therein remain unknown.

In some aspects these facts spell decay for New England, but there are many other facts now becoming apparent that show that New England textile manufacturing is getting a new lease of life.

In common with England, Continental Europe, and this country, cotton manufacturers are grappling with the advent of rayon yarns in their mills in such a large volume in yardage, that cotton spindles are being less employed, and the future of cotton in dress fabrics has become a topic of discussion among buyers everywhere. The markets are being flooded with samples of rayon and cotton mixed materials and it is now announced that cotton mills have become the largest customers of the rayon producers.

If all the rayon now being made in the world were going into cotton cloth, it would mean only that about the weight of 400,000 bales of cotton was being displaced by the new material. But in yardage of output the use of the new fiber seems immense because from 25 to 50 per cent of each yard made consists of rayon, the balance being cotton that is hardly mentioned. To what extent this development will go, no one can tell. For the time being, the use of the fiber in cotton goods has many of the aspects of a vogue or fad, but there is no question that eventually the new material will make a permanent place for itself.

New England manufacturers are not among those who believe that the feverish demand of today for rayon forecasts the decay of cotton. On the contrary—and here it is seen to what extent New Englanders are awakening—some of the choicest and most popular all-cotton cloths are coming from the looms and finishing plants that the trade has seen in volume in any country previous to this time.

It is being preached quietly by experienced cotton manufacturers that cotton will come into its own as a serviceable and well styled fiber when rayon has found a place that is not now thought about. There are young New England men who are looking forward to an entirely new development in cotton manufacturing in which New England will participate because of capital, enterprise, and skill, that do not depend upon location, wages, or legislation only.

It is because of the existence of sentiment of this sort, supplemented by action that is only now beginning to be understood, that men who are watching New England developments closely are convinced that a turn has come in the general slide toward the final elimination of New England from the field of textile manufacturing.

One of the most interesting things of the past month was the announcement that hereafter the offerings of Pacific mills products will be made in ways to meet the market demands for styled fabrics delivered quickly and in the limited quantities wanted by buyers. This entails the changing of methods in merchandising that have characterized conservative cotton goods commission houses for two generations. The break in this direction was made by Amory, Browne & Co., a couple of years ago when they began

To the Textile Mill Owners of the United States

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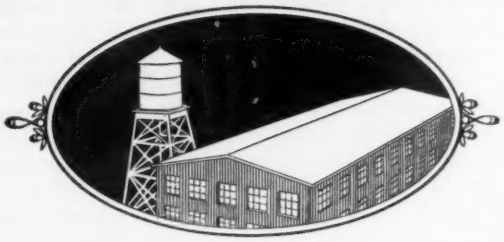

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—Powder made of pure metallic aluminum flakes.
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EIGHTEEN OFFICES IN PRINCIPAL AMERICAN CITIES

offering out highly styled ginghams or goods of yarn dyed construction, made in some of the oldest and best known New England corporations. While other selling houses were seeking relief from hard competition on staple fabrics this organization was trying out what could be done to sell the varied lines of goods buyers seemed to be clamoring for.

While this particular commission house was among the first that attracted wide attention because of the change in the class of its offering others were at work in directions not fully appreciated until this season. The owners of the American Printing Company had been at work in Fall River changing over their printing machinery and their huge printing plant to produce goods never handled by the concern before. This season it has been a leader in the sales of printed broadcloths, the new styles of vat dyed shirtings, printed and dyed charmeuse, pongees, and some of the percales that are known by style rather than by group names. It cost $7,000,000 to make the change, but this huge plant has turned out more goods of this sort than ever before produced in American plants.

The Pacific plant is capable of the same sort of handling, and a beginning has been made at the merchandising end where such things must begin to be roundly successful. In some of the larger job printing plants changes are being made so that any sort of rayon materials made can be finished and delivered in the ways the markets are now exacting of those who use cotton as the foundation of their business. Several mills in New England that hardly made rayon experiments until within two years are now running on cotton warp and rayon filled goods exclusively.

Some are in Connecticut and Rhode Island, but many are in Massachusetts, where a 48-hour law, and other restrictions were due to kill industry of a textile character years ago. That is, death was to come according to the pessimists. For the time being, the optimists are having an inning and they seem to be batting winning ball.

As noted often in this correspondence, the chief liability in New England, so far as industry of a textile character was concerned, was the lack of broad public spirit that would induce people to give mills and their owners a fair deal. Communism, socialism, or some other vicious "ism" appeared to have possessed the conservative thought of New Englanders and for years they went on slamming the goose that was laying the needful eggs. Labor union agitators from outside the section, and particularly the new leader of the American Federation of Labor, do not yet see that a definite change has come and that further unfair tactics against New England will not be tolerated, whether provoked by political, sectional or other causes.

A Loyalty League has been formed in Rhode Island, for example, and business men all over the State are working to create a sensible spirit of helpfulness for local enterprises, and to spread a knowledge among all the people of the importance of the industries by showing their products in stores, exhibitions, etc., for a week, the first full one in September.

All through the southern textile field, such expressions are accepted as a matter of course, and they used to be so considered in New England. That they will be again in New England, before many years, is the belief of some of the men now coming to the front in cotton and other sorts of textile manufacturing.

Fall River still continues as the center hardest hit by inability to compete in the markets profitably on the print cloth yarn goods it is generally fitted to make. The fine yarn cloth mills and the two leading print works keep busy and are profitable and there are a few mills making sateens and specialties that keep moving. But as much as 50 per cent of the spindleage has been inactive this summer, or approximately 2,000,000 spindles.

In the neighboring city of New Bedford, only about 20 per cent of the spindles have been idle. The looms have been running practically in full, chiefly on cotton and silk, rayon, or goods like fine broadcloths, pongees, fine combed yarn sateens, or specialties in shirtings. In Western Massachusetts there are several groups of old established cotton mill plants like the Dwight, Palmer and others that have made nationally famous coarse goods, that are being changed onto other lines where competition is less or to goods for which people are calling.

As an instance of changes that have come within a comparatively short time in the section, it was stated recently that while New England has the largest percentage of looms equipped to make high quality cotton bedspreads, the looms are engaged today on goods only half cotton, but costing very much more, and selling for more. A mill in Connecticut that made fine lawns, carded, now has not a yard of the goods on its looms. It is making a high grade of fine rayon and cotton material for ladies' underwear, because its old cutting up customers called for it.

Cotton Comment.

BY H. AND B. BEER.

New Orleans, August 11th, 1925.

So far this summer the market has ruled comparatively steady compared with the wide fluctuations experienced at this period of the year in previous seasons, due to the indicated yield about matching this season's prospective consumption, a situation that has served to stabilize values, but at the expense of business.

Returns to the government, as of August 1st, averaged the condition of the crop at 65.6 vs. 70.4 on July 16th of this year and 67.4 on August 1st, 1924, indicating a production of 13,566,000 bales compared with 13,588,000 as of July 16th this year and last year's final count of 13,619,000 bales. Linters not included.

During the past month the drouth was effectually broken in Oklahoma and in Texas, except in the central and southern portions of Texas, and of late generous well distributed beneficial rains have fallen throughout the Mississippi Valley States and Alabama, while scattered showers have been the rule in the South Atlantic region. In fact further beneficial rains have fallen of late in the northern portion of the western belt, in the central belt and in parts of the eastern belt, and the general impression now is that the indicated yield is probably somewhat larger than the recent returns to Washington indicated.

Even though the growing crop should be about 15,000,000 bales including linters, the fact that spinners of the world took 14,487,000 bales of American cotton last season, of which 14,247,000 were actually consumed, would probably not be burdensome, although it would likely tend to depress prices somewhat in the early part of the season

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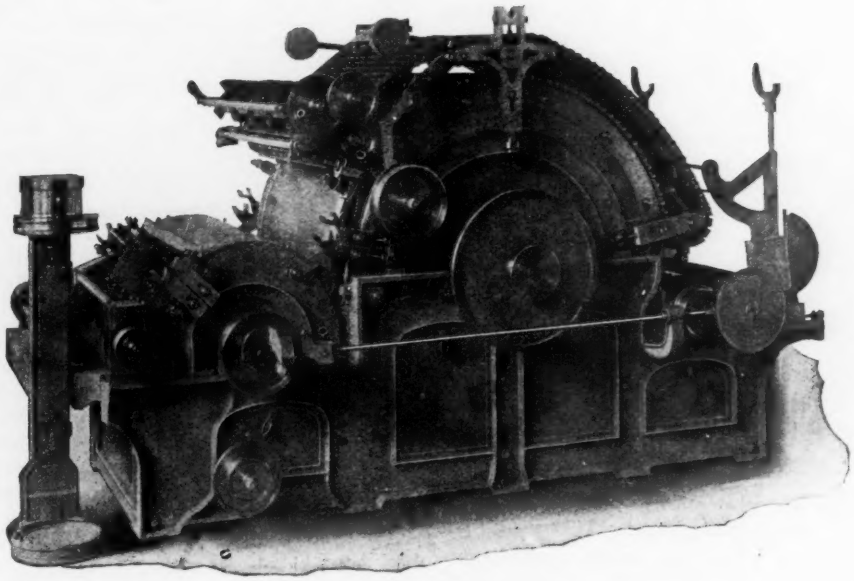

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when the weight of the movement is on the market, in which case trade buying would probably increase, especially on the scale down, as in that case, since the present price of middling in New Orleans is 23.30, spinners would have the advantage of buying at a lower level than the average price of middling (which was the average of the past crop) 24.27 cents per pound. Season before last the average price of middling was 31.67.

As yet it is too early to form a definite idea as to the probable size of this year's production, much depending upon future climatic conditions and possible damage by insects, especially by the weevil, particularly to the east of the Mississippi River, although latest of advices regarding weevil are not alarming even though some injury is being inflicted in certain localities.

One feature of the situation, which has not been given serious consideration by the trade as yet, is that in arriving at the probable size of the crop, individuals and officials have not allowed for more than a normal abandonment of acreage, whereas it is likely that, due to the severe drouth, the worst on record in the Southwest, much land in Texas, in the central and southern portions of the State, has undoubtedly been abandoned because of the inability to make a crop for the want of moisture. This feature of the situation may prove an important one before the final official crop forecast is released in December.

Aside of this probable development later on, the fact remains that the present outlook for the crop, as per latest of government returns, point to a yield of only 13,566,000 bales. To which might be added 900,000 bales for linters, or a total crop of about 14,500,000 bales, or about the same as last year's production, including linters. Under the circumstances, there is no cause for complaint on the part of spinners, nor on the part of farmers, except the unfortunates in the drouth stricken areas of Texas, as prospects are that a fair price will be obtained by farmers from the spinners, and spinners will likely realize a satisfactory figure for the manufactured product from the public. As a matter of fact, both farmer and spinner, especially in America, are in a better position than they were last year at this time.

Machine Calico Printing.

(*Continued from page* 1118.)

insoluble state. The fixation of these colors on the cloth is usually effected by means of a solution of albumen or casein in which they are mixed and which on drying and steaming coagulates and fixes them upon the cloth mechanically. The pigments of the most importance are: Chrome yellow and orange; Guignet's Green (an oxide of chromium); Vermilion and its substitutes, which consist of most of the aniline color lakes, of red lead tinted with basic colors, lampblack and the various earths, umbers, ochres, siennas, etc., and mixtures of oxides of iron and other precipitates for buff and fawn.

The making up of the foregoing colors is identical except that some are in paste and some in powder form.

PIGMENT RED.

250 grams Vermilion
500 grams Blood Albumen Solution 40 per cent
250 grams Gum tragacanth 8 per cent

1000

PIGMENT YELLOW OR ORANGE.

300 grams Chrome yellow or orange
300 grams Blood Albumen Solution 40 per cent
30 grams Cottonseed oil
20 grams Glycerin
30 grams Turpentine
320 grams Tragacanth thickening 6 per cent

1000

PIGMENT BLUE (pink, green or violet).

300 grams Ultramarine blue or pink, etc.
300 grams Albumen Solution 40 per cent
30 grams Glycerin
20 grams Turpentine
30 grams Oil
10 grams Ammonia
310 grams Tragacanth thickening 6 per cent

1000

PIGMENT GREEN.

240 grams Guignet's Green
280 grams Albumen Solution 40 per cent
410 grams Tragacanth thickening 6 per cent
10 grams Ammonia
30 grams Turpentine
30 grams Oil

1000

PIGMENT GREY.

400 grams Lampblack
300 grams Albumen 40 per cent
300 grams Gum tragacanth solution 6 per cent

1000

The pigment, whatever it may be, in all the pigment color pastes, is at first thoroughly mixed with the blood albumen, which must be added gradually; the thickening is then added and the whole thoroughly incorporated together. It is better to do this work in grinding mills than beat the colors and their thickenings together with the hands or in a color pan; the whole mass must be smooth and homogeneous.

There is one disadvantage that pigment colors possess: they are very prone to froth while printing. This is largely due to the churning action they are subject to in the color box. Nothing has been found that will overcome this difficulty entirely, but it can be reduced somewhat by the addition of substances that will not retain air, such as turpentine, benzene and ammonia. Oil is a benefit for this and it also prevents "sticking in."

Glue or casein may be used as a fixing agent, in this case a solution of casein in borax, or if glue is used in place of albumen. It is printed on and the goods are then passed through a chamber containing formaldehyde vapor, which renders the glue or casein insoluble in water.

As before stated, the pigment colors are steamed after printing, for one hour, the steaming fixes and coagulates the albumen, and pigment colors fixed in this way are very fast to soaping, but are removed by rubbing and are therefore soaped in the open, soaped at full width—never in the rope state.

Pigment colors are used mostly for linings and pale blotches. They are fast to light but will not wash, and cannot be used when a lustrous finish is wanted *all over* the cloth, as the pigment pattern itself will not take a high finish, but is full. As well as direct printing, these colors are much used for resists in aniline black and for discharges on indigo dyed goods.

(This is the ninth of a series of articles on "Machine Calico Printing," by Mr. Nanson. The next will appear in an early issue.—The Editor.)

NOTES ABOUT MEN YOU KNOW OR KNOW ABOUT

MARION T. GRIMES, for the past five years superintendent of the Gluck Mills, Anderson, S. C., has resigned that position, effective September 1st.

R. K. RUDICIL, formerly overseer of carding in the Nottingham Mill of B. B. & R. Knight, Inc., at Providence, R. I., has resigned and returned to the South.

FRANK G. NORTH, president, and Arthur W. Harris, treasurer, Atlanta Harness & Reed Mfg. Company, Atlanta, in company with Mrs. North and Mrs. Harris, have sailed for an extended trip abroad.

R. H. CHASE has become superintendent of the Potter Fine Spinners, Inc., Pawtucket, R. I. He was formerly assistant superintendent of the Crown Mfg. Company of Pawtucket.

CHARLES M. PAYNE has become overseer of spinning at the Crown-Boylston Mills, Dalton, Ga.

W. R. OWENS has become overseer of carding at the China Grove Cotton Mills, China Grove, N. C. He formerly held a similar position at the Wampum Cotton Mills, Lincolnton, N. C.

W. A. BALL recently became superintendent of the Standard Hosiery Mills, near Burlington, N. C. He has been for several years superintendent of the Catawba Knitting Company, at Rock Hill, S. C.

W. J. JORDAN has gone to the Maginnis Cotton Mills, New Orleans, La., as overseer of spinning. He formerly held a similar position in the yarn manufacturing department of the Perkins Hosiery Mills, at Columbus, Ga.

O. C. BAGLEY has become overseer of spinning at the Dixie Cotton Mills, LaGrange, Ga. He succeeds S. M. Thrower, resigned, who is now connected with the Stark Mills, Hogansville, Ga., in the twister department.

B. J. BODDIE, superintendent of the Lullwater Manufacturing Company, Greenville, S. C., which plant recently was closed indefinitely ,has been transferred to the superintendency of the company's mill at East Point, Ga

J. M. BATSON has resigned as superintendent of the Opelika Manufacturing Company, Opelika, Ala., and has become general manager of the Lavonia Cotton Manufacturing Company, Lavonia, Ga.

ROBERT HORSLEY has been made superintendent of the Opelika Manufacturing Company succeeding Mr. Batson.

A. E. NANCE, formerly overseer of carding at the China Grove Cotton Mills, China Grove, N. C., has taken a similar position at the Carbarrus Manufactuing Company, Kannapolis, N. C., succeeding J. W. Moore.

D. C. JOLLEY recently became overseer of carding at the Orr Cotton Mills, Anderson, S. C. He was formerly at the Wallace Manufacturing Company, Jonesville, S. C., in a similar capacity.

H. E. STILL, who recently resigned as overseer of carding at the Orr Mills, has a similar position at the Ninety-Six Cotton Mills, Ninety-Six, S. C.

E. D. UNDERWOOD recently became overseer of weaving at the Wennonah Cotton Mills, Lexington, N. C., succeeding M. P. Childers, resigned.

ROBERT W. FULLER, who for a great many years was connected with the New England technical and sales department of the American Dyewood Company, and recently of Jennings & Company, has assumed the duties of technical advisor in the Boston sales department of the American Aniline Products, Inc.

J. P. INGLETT has resigned as overseer of carding at the Buck Creek Cotton Mills, Siluria, Ala., and has taken a position at the spinning mill of the Danville Knitting Mills, Bon Air, Ala.

T. V. BUCKWALTER, who has been chief engineer for the Timken Roller Bearing Company, has been made vice president in charge of engineering.

V. E. MCDOWELL has been promoted to the position of assistant overseer of carding at the No. 3 Mill, Eagle & Phenix Mills, Columbus, Ga.

EDGAR MITCHELL, who for nearly twelve years has been overseer of the cloth room at the Lanett Cotton Mills, West Point, Georgia, has recently resigned, effective August 15th, to take up his residence in Florida. Upon leaving, his many friends at the mill and office gave him a farewell banquet at the hotel in West Point and presented him with some suitable remembrances.

D. C. WILLIAMS, superintendent of the Rockfish Mills, Hope Mills, N. C., will also be superintendent of the Cumberland Mills, near Fayetteville, N. C., which were recently purchased by R. L. Huffines, secretary of the former mills.

R. E. MCDONALD is vice-president, and L. O. Erwin is secretary, treasurer and superistendent of the Erwin Mfg. Company, a new underwear mill at Huntsville, Ala. Mr. McDonald is agent of the Lowe Manufacturing Company, and Mr. Erwin has been superintendent of the Huntsville Knitting Mills. J. F. Chambers is president of the new corporation.

CHARLES JONES has been promoted to overseer of carding in Mill No. 2, Carbarrus Cotton Mills, Kannapolis, N. C.

J. M. HOPPER has resigned as overseer of weaving at the Savona Mfg. Company, Charlotte, N. C., and has taken a position erecting and having charge of Jacquard looms at the plant of the Manville-Jenckes Company, High Shoals, N. C.

J. F. CASTO has been promoted from second hand of the speeder room to acting night overseer at the Lancaster Mills, Clinton, Mass. John Boland, third hand, was promoted to the position of second hand.

C. C. HARDING, well known in the textile industry, is now representing the Wayne Tank and Pump Co., Fort Wayne, Ind., on their line of industrial water softeners, with headquarters at 222-3 Candler Building, Atlanta, Ga.

JOHN S. ROBERTS, president, Georgia Webbing and Tape Co., Columbus, Georgia, spent several weeks during August and September on a vacation visiting his son.

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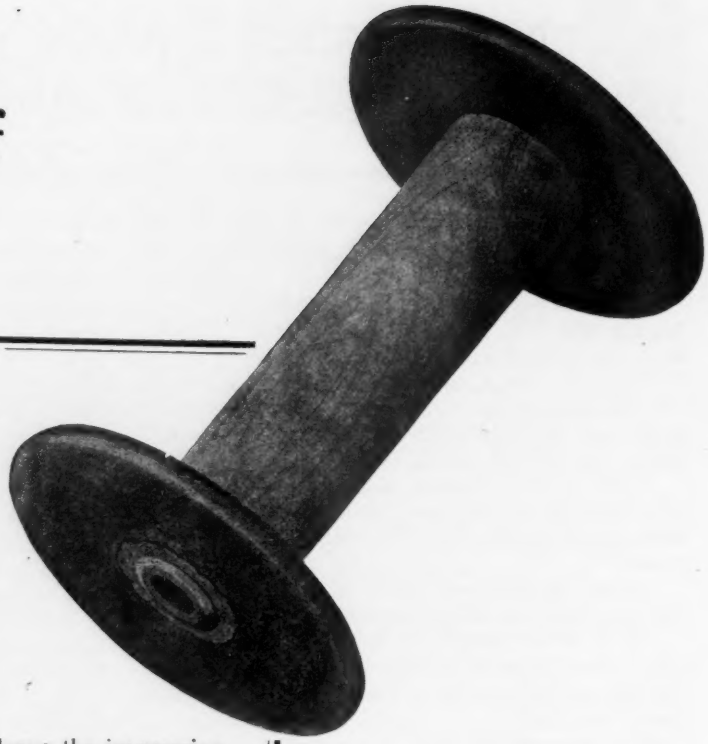

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HOW OTHER MEN MANAGE

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We invite our readers to make use of this department for the discussion of any and all problems arising in the mill or the finishing plant. Questions, answers or letters need not conform to any particular style and will be properly edited before publishing. The editors do not hold themselves responsible for any statements of opinion or fact which may appear in this department unless so endorsed. This department is open to all.

Two Sets of Lease Rods at the Slasher.

EDITOR COTTON:

I note what "T. S. (Mass.)," in the April issue, and "F. B. (Conn.)" and "Mack (Ga.)," in the July issue, have to say in regard to two sets of lease rods at the slasher. We have been using two sets of lease rods in our mill for over fifteen years, on high sley goods, and the results are very gratifying. Taped ends are unheard of, and the warp-tying machine operator never complains of "doubles." In our weave sheds, one can walk down row after row, between the looms, and never see an extra warp end running around the beam and going into waste.

"Mack (Ga.)" doesn't advise the use of two sets of lease rods (split sections, as he calls them) on sets of 4,000 ends, but recommends running one set as two until they reach the size vat and then splitting them again at the head-section. I can't quite get the logic of this statement. We are running sets of 4,100 ends, using ten beams to a set, two sets of lease rods, and 330 dents in the raddle. As the sets referred to are all white, we don't pick or count our sets in, but strike-in with a comb just before the yarn enters the size vat, at the start of a set. "Mack (Ga.)" speaks of coarse yarns, so perhaps I had better state that our sets are 4,100 ends of 30s.

I would like to see some more discussion on slashing in coming issues. D. H. (MAINE)

Roving Frame Tensions.

EDITOR COTTON:

In reply to the inquiry of "G. D. S. (S. C.)" in June COTTON regarding speeder tensions, will say that in order to obtain the proper tension on roving frames, first, the correct lay gear should be put on. If the ends run tight at the ends of a set and loose at the start, this is conclusive evidence that the lay gear on the machine is not right.

To find the proper lay gear find the standard twist for the hank roving being made and move the decimal point one place to the right. The answer will be the lays per inch that should be put on the bobbin. Then put on a lay gear to give the number of lays.

2.00 hank $\sqrt{2.00} = 1.414$

$1.414 \times 1.2 = 1.696 = 16.9$ lays per inch on bobbins.

After having done this it is a very easy matter to decide on the proper tension gear and there should be no further trouble. Unless the room is subjected to wide variations in atmospheric conditions the tension gear need not be changed from one year's end to another. R. E. I. (MASS.)

EDITOR COTTON:

In the June issue of COTTON "G. D. S. (S. C.)" was asking for information regarding speeder problems and will say that I have been confronted with the same problems a number of times.

The first problem is that of maintaining an even tension throughout the set. The first thing to do is to see that the frames are running standard speed. If they are not, they should be made to. The standard speed can be found in the catalog issued by the builders.

The next thing to do is to start the cone belt at the extreme small end of the bottom cone at the beginning of a set. All is now in readiness to start up the frame, being sure that the builder has just changed so that the rail has started to go down. The rail should be run down about two inches. The correct cone gear should then be put on, which will maintain a perfect tension while the rail is going down on its first full layer. Care should also be taken to see that the correct rail gear is on at this time. I would advise laying the coils very close.

I want to make it clear to "G. D. S." that the tension on the first layer of a bobbin is perfected by the cone gear with a slight adjustment on the cone belt shipper, and that the rack gear has nothing whatever to do with the tension on the first layer. But, the instant that the builder changes at the end of the first layer the tension is then governed by the rack gear throughout the set.

"G. D. S." says that his ends run loose at the beginning of every doff and then run all right until an hour before the doff. This proves that he has too large a rack gear. Allowing these ends to run loose at the beginning of a doff is the cause of the ends being too tight and breaking at the end of that doff, because the instant that the ends are allowed to run slack a soft bobbin has begun to be made, and a soft bobbin increases in diameter and circumference faster than a hard bobbin. This increase is so slight that it does not show up until the bobbin is about three-quarters full. From that time until the end of the set the ends will continue to break. This explains why it is necessary to let out the rack. By so doing it of course reduces the speed of the bobbins, which allows the frames to run all right the rest of the set.

I should also mention twist and taper. I believe in an extra tooth of twist. Lengthen the taper until there are no runover bobbins. What "G. D. S." should do is to adjust his frames so that the tension will be tight from the beginning clear through the set. In most cases this can

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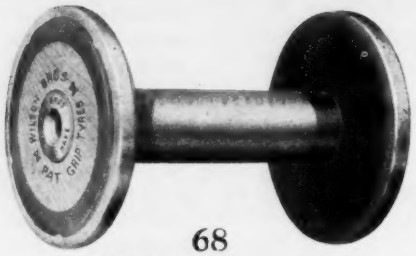

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be done by experimenting with the rack and lay gears at the beginning of a set.

There is a concave part on the top cone and a convex part on the bottom cone, each of which starts approximately six inches from the end. The purpose of these concave and convex parts is to allow for the expansion of the roving on the bobbin. Now, owing to the fact that the bobbin is hard, the first ten or fifteen layers of roving on the bobbin do not expand as much as the layers to follow. This is why the concave and convex parts start approximately six inches from the end.

This is where I think the troubles of "G. D. S." begins. He allows his cone belt to reach this concave part and convex part before the circumference of the bobbins is large enough to take care of the amount of roving going through the rollers. Therefore the ends will run slack. What "G. D. S." should do is to begin with what he considers a tight rack gear. If he finds the ends still run slack the first hour, he should put on from two to four teeth tighter rack gear the next doff and continue to do so as long as they continue to run slack.

In some cases it is necessary to go as far in this direction as to put on one tooth larger rail gear. The point I am bringing out is that ten changes on a thirty tooth rack gear on Howard and Bullough speeders let the cone belt out more than ten changes on a thirty-four tooth rack gear. This is the case on any make of speeder.

Do not misunderstand me in thinking that I believe in a tight tension, for I do not. After "G. D. S." gets his frames working nicely he can then change his rack gear one tooth slacker. In most cases with standard speed, and by adopting the foregoing principles I have been able to run a speeder from set to set without interfering with the rack.

In exceptional cases, it is necessary to speed up the whole frame. I have seen some speeders that would run very well for about three-quarters of a set and then run tight and break. If such is the case, the only thing to do is to speed up the frame until it will run an entire set without the ends breaking. It is a well known fact that the higher the speed the harder the bobbin. A spindle speed of 1350 will give you a bobbin smaller in circumference than a speed of 1250.

"G. D. S." says that he is having trouble on dog days and damp days. If he can regulate his frame as I have described, he will have no trouble with damp days or wet days. I would advise him to go over every frame and see that all corresponding gears are alike and to allow none of his section men to change any gears without his permission.

In regard to dog days, I would advise putting in two teeth of twist the first of July and taking it out the first of September.

In regard to weights on rolls I would recommend using the standard weights issued by the builders.

If this will give "G. D. S." any confidence, I will say that I have about 150 speeders under my charge and that they gave me the same trouble about six years ago that he is now having, but for the last three years I have not changed a rack gear on the warp speeders and only once on the filling. I have my humidifiers running full force summer and winter, with the exception of dog day weather, to the extent that I have seen water dripping from the windows. My production has increased, cost decreased and the breakage of yarn has increased from 54 to 64 on 30s warps.

K. F. F. (MASS.)

EDITOR COTTON:

This is in reply to "G. D. S. (S. C.)," who asked in the June issue about tension on roving frames. He says the work is too loose on the start of every doff, with empty bobbins, and then very good until about an hour before the doff; then it is too tight, it stretches the roving and must be let off.

According to what he says, his frames have never been properly tensioned, and again, he states they are old model frames. This brings to mind some old Saco-Water Power frames I have. About two or three years ago we had them worked over, with new spindle tops, steps and bolsters where needed, and had them cleaned, lined and leveled, and reduced the speeds. The other roving frames were of a later model, but these old frames are running as well or better than the new ones. What we did, in addition to general overhauling, was to lag up the bottom cones. This was done after we had secured as good a tension as we could on the frames with the tension gear adjustment, the cone adjustment, compound gear, etc.

We commenced at the large end of the bottom cone with a strip of cloth, using roller shop glue to stick it to the cones. The first strip was two inches wide, placed around the cone and glued; then the next strip was two inches wider and was placed on top of this strip; each time we commenced at the large end of the cone with this cover, making the next two inches still wider, skipping two inches every time for about seven times, and then skipping three inches, covering the cone on to the small end. When the little end was reached, we covered with about three strips, making this about 3/16-inch larger in diameter, while the large end was about ¾-inch larger in diameter. This of course must be determined to suit the hank roving. In my case these were 11 x 5½ slubbers, making a .76 hank roving. We used a 5.00-yard 26-inch cloth to cover the cones.

The idea was to increase the cone diameter in a sloping manner from the large end to the small end with all of the diameter possible, without changing the gears for the tension. This we did, and it is very seldom we find an end down. There is no monkeying with the tension gears. One man, in the July issue, suggested that "G. D. S." buy new and up-to-date machinery But he has got this machinery to run, and if there was any chance for him to get new machinery, he wouldn't probably be asking these questions.

I might say we are making almost the same hank as "G. D. S." Ours is 2.00 hank intermediate, 5.80 and 7.10 hank on the roving frames. If it is possible for "G. D. S." to visit Georgia, I would be glad for him to come over and examine these old frames and see how they run. We also put this covering on the other frames, and it improved the tension, but not so noticeably as on the slubbers. This mill is not so very far from the South Carolina line, and I would be glad to welcome "G. D. S." if he will advise the editor, who will put him in touch with me direct.

T. A. D. (GA.)

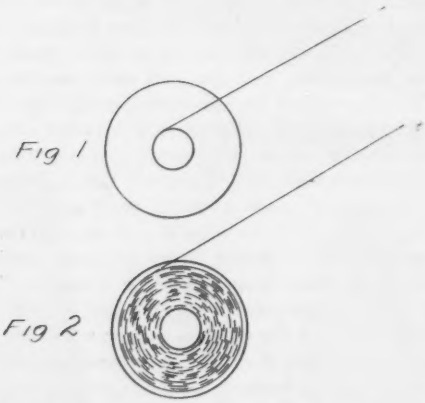
The Whitin Machine Works, Whitinsville, Mass., have just issued a new booklet on the Whitin Drawing Frame, Model H, in which this new machine is thoroughly illustrated and described. The booklet also contains some carefully worked out production tables as well as a number of other features of interest.

Slasher Tension Adjustment.

EDITOR COTTON:

In the course of my work I visit a great many slasher rooms and it is surprising to see how few slasher foremen require any adjustment of the weight on the beams in the creel or in the friction that drives the loom beam on the front of the slasher. Also, invariably, I find that they will hang a weight over the head of one or more beams in the creel at the time of creeling up and never change this weight until the set runs out. Similarly, they will set the friction at some supposedly correct point and never change it from morning till night unless a lighter or heavier warp is put in.

I find that a great many slasher men actually do not know that the friction should be regulated depending on the amount of yarn on the beam at any given time. However, I am inclined to think that most of them know better but take the attitude of one slasher room boss, who said that he knew the friction should be changed but he was afraid to allow the slasher tenders to change it for fear that they might forget to change back again when laying in a set, or after doffing a loom beam. This man said he had tried regulating the loom beam friction and found that when the tenders forgot to set the weight back after doffing that such a terrific strain was put on the warp that they frequently broke down some of the ends. The diagrams in Fig. 1 and Fig. 2 clearly illustrate the necessity for varying the friction with the change in size of the beam. Figure 1 shows a loom beam which has just been set in, and on it the warp is wrapping directly on the barrel of the beam. Figure 2 shows the same beam when nearly full. With a constant friction on the beam drive it will readily be seen that the tension in the sheet of warp is inversely proportional to the diameter of the surface on which the yarn is being wrapped. In the case of Fig. 1, this is a diameter of approximately 5 inches, while in Fig. 2 the diameter is approximately 18 inches. With a constant weight on the friction arm the tension in the warp, when the beam is full, will only be 28 per cent of what it was when the beam started. This makes it quite clear that the weight on the friction arm should be frequently adjusted during the building of a beam to compensate for the increasing diameter which causes a given friction to produce less and less tension as the diameter increases. It is, of course, very essential that the friction weight be returned to the starting point at each doff.



In the case of section beams in the creel, the conditions are reversed. Figure 2 would illustrate the full beam at the start of a set and Fig. 1, the empty beam at the end. The diameter of heads and barrel are, of course, different from those of the loom beams but the proportions are very nearly the same.

A given weight assumed to be correct for the start of a set would be at least three times too heavy when the yarn was pulling from the small diameter shown in Fig. 1. When it is remembered that the beam is revolving at a much higher rate of speed when the diameter of the yarn on the barrel is small, it can be seen that allowance must be made for the increased friction, due to this higher speed.

The beam shown in Fig. 1, upon unwinding almost to the end of the warp, would be running more than three times as fast as when first started up; as shown in Fig. 2. So that the increased tension in the warp is due not only to the diminishing size of the beam barrel but to the increased speed of the head sliding on the rope. Just how much effect the increased speed of the heads will be on the tension in the yarn would be hard to determine exactly but it undoubtedly has some effect. I would be very much interested in seeing some letters from slasher overseers on this subject. It seems so obvious that this friction on both the back and front of the slashers should be frequently adjusted that it is hard to understand how good uniform work can be got off the machine where no attention is paid to these points.

N. P. (MASS.)

The Causes of "Thread Laps" in Spinning.

EDITOR COTTON:

Replying to the inquiry of "Bert (R. I.)" on the subject of "thread laps" as published in the August number of COTTON, I would say that I have often noticed when the top leather rolls are damp or wet that they have a tendency to lick up the thread and spoil the roll. Especially have I had this trouble with the rolls located near humidifiers.

When it comes to the thread lapping around the steel rolls, I have often found that by looking over the steel roll with the glass, I would find just the least chip or nick on the steel roll and this would catch the thread every time the roving traverse would take the end over this rough place. I have stopped this sometimes by putting on a little heavier traveler. Another thing, I have never put a new leather covered roll where I have taken off a thread lap. I always put on a used roll, as it has a tendency to mesh in the flutes better. Also, I find that unless the little burr or nick is found and polished off the steel roll, the thread will have a tendency to again lap up, and if this occurred it would spoil the new roll if one had just been put on.

I have also had quite a lot of trouble with the roving wrapping around the middle steel roll. I have found the cause of this to be that the middle roll would be spread too far away from the front roll.

I for one, shall be glad to hear from "Bert" at some later date with the description of how he overcame his trouble.

D. L. E. (ALA.)

EDITOR COTTON:

The question of "Bert (R. I.)," with reference to "thread laps," as published in the August issue of COTTON, reminds

me of similar trouble I have experienced on our 50s special twist we were running. In fact, the yarn had a twist of 54.52 per inch, and I used a 13/0 flat top traveler. I noticed that at quite a few intervals my leather rolls had to be changed. The end would run so light and slack due to the lightness of the traveler that it would run back around the steel roll, causing an ugly crease in the leather top roll.

As a remedy to lessen the slackness and get the yarn running better, I changed to a 11/0 flat top traveler, and lowered the thread board 3/16-inch lower than the level of the steel roll beam, bringing the thread guide to about 1 3/16 inch from the top of the bobbin. This brought the ballooning to about one-half its former size.

This proved to be just the thing, and it is very seldom now that our yarn winds around either roll.

I would also advise "Bert" to notice that in very damp weather, on most occasions, the glue that is used where the leather covering laps together gets on the steel roll in such a small quantity that it is hardly noticeable, but I have seen this on our machine when there was excessive heat or dampness, especially where the machines were close to opened windows. The glue would tend to stick a little on the sharp edges of the flutes, and when the end passed by it would stick to the roll and run back around it.

We are now trying out cork-covered rolls, and the glue is underneath the cork and cannot stick to the rolls. These rolls have worked wonders for us and I think will prove to be a profitable investment.

If "Bert" will give the hank roving and draft he is using, and how many teeth in the crown gear, I will try to give him some further suggestions.

J. A. H. (CONNECTICUT)

What Causes Uneven Work on a Speeder.

EDITOR COTTON:

I notice that one of your readers of the "How Other Men Manage" department is having trouble with uneven roving and wants to know the cause for it. In answer to this question I will say that there are several causes, which may or may not be responsible for his particular trouble, but will mention a few on the chance of being able to aid him a little in his difficulty.

The trouble may be caused by the end being wound around the presser a different number of times; allowing the eye and hollow leg to become clogged with dirt; singling and doubling; bobbin yarns jumping here and there (when bobbin yarns jump there will be found much roving breaking back in the spinning frame); coils over-riding each other.

Uneven roving can be caused by the laps being uneven at the picker room; poor piecing when creeling; allowing too long a lap by not breaking off the roving, say to ½ inch; skewers binding in the creels; creel steps being broken; top and bottom clearers not kept clean; rolls not properly covered and not of the same diameter; rolls not oiled and properly set for the length of staple being used; loose fitting joints in steel rolls; necks of steel rolls being worn; too much draft between the back and middle rolls; too much draft in the whole frame; tension too tight; allowing frame hands to take up on the tension instead of changing the tension gear; the winding of the roving onto the bobbin not being as it should by not having on proper cone gear, or the bottom cone change gear not being properly set; bad fitting and unbalanced flyers; bobbins being of different size; fanning off of machine; roving trumpets partly clogged with lint and dirt; running top rolls with grooves in them; letting too much fly accumulate in front of the frame and falling or being blown into roving laps, getting around the steel rolls, thereby increasing the diameter of the roll and of course making that one end in particular heavy; and top leather rolls not being oiled enough, causing them to bind and stretch the roving.

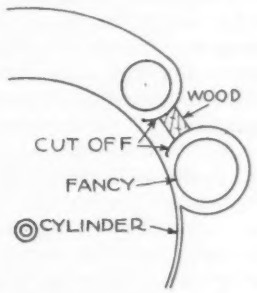
There are many things that will cause uneven roving, things that we haven't the time just now to go into, but the foregoing will give the reader some of the most common causes of uneven roving on the speeder and I trust will be of some assistance to him. BAB (N. C.)

The Roller and Clearer Card Difficulty.

EDITOR COTTON:

Referring to the inquiry by "Contributor No. 454" in connection with the roller and clearer card difficulty and the speed of his fancy roller, will say that in the following reply I am not only including my own opinion, but also the opinion of another man whom I regard as the foremost expert on waste working in this territory.

Neither of us is sufficiently familiar with the Asa Lees roller and clearer cards to enable us to discuss intelligently the data furnished with the question. We do, however, agree that the samples you forward indicate that the difficulty in this case is due to the fancy. We think that it would be best for the cylinders to be clothed with No. 33s



wire and the doffers with No. 34s. We would clothe the fancy with about No. 32s long tooth, soft wire, or straight tooth, *open set* wire. If Contributor No. 454 will take this matter up with the Davis & Furber Machine Company, North Andover, Mass., they will send him a catalogue on card clothing which will describe the clothing to which we refer. The speed of the fancy roll should be from 15 to 25 per cent faster than the cylinder.

We do not think that the doffer or anything else is causing the stock to be "pilly" as indicated by some of the samples. However, there is a possibility that the housing of the fancy and the roller and clearer approach too closely to the cylinder and that the stock is being rolled up at that point. If this is the case then these housings should be cut off as indicated by the sketch, and a wood strip used to fill in the space.

I trust this answer will be of some assistance to your contributor and that he will later advise as to how he made out with this proposition. CONTRIBUTOR NO. 622.

EDITOR COTTON:

In reply to Contributor No. 454 regarding the speed of the fancy on roller and clearer cards, I find by running the fancy so that its surface speed will be about 10 or 12 per cent faster than the surface speed of the cylinder, the cylinder can be kept clean by stripping morning and evening.

The fancy should be set to dip into the cylinder wire enough to make a stripe one inch wide across the cylinder when the fancy is turned and the cylinder standing. The fancy should be ground rather often, about every six weeks or two months, more to dull it than to sharpen it, as the points of the wire by dipping into the cylinder wire, will become as sharp as needles and will not raise the stock as well as would be the case if the points are blunt.

I do not think No. 80 wire is too fine for the cylinder fillet. Of course the amount of foreign matter in the waste should help to determine the proper number of wire to use. If the stock is put through a good cleaning process before coming to the cards a finer number of wire can be used and better results obtained. Waste should be carded as much as possible.

O. H. N. (N. C.)

EDITOR COTTON:

In reply to the question on roller and clearer cards, fancies, etc., from "Contributor No. 454" in the July issue of COTTON:

The main cylinder of full roller cards is usually run 120 r.p.m. when using very short-fibered stock. The surface speed being about 1,600 feet per minute, the surface speed of the licker-in should be about 800 feet per minute, thus giving the cylinder an opportunity to strip the licker-in, the teeth of the wire pointing up at the point of contact with the licker-in. The cotton is then taken by the cylinder to the first set of strippers and workers.

The strippers are usually set to 28/1000 from the cylinder on this man's grade of cotton—very short fibers for making coarse cotton blankets—and the workers set to a 7/1000 from the cylinder and stripper. Some mills find it good practice to set the workers and strippers a little closer gradually, coming to the fancy roll. The worker runs slower than the cylinder and therefore picks up the cotton from the cylinder. The stripper strips it off the worker and deposits it again on the cylinder.

This operation is continued until the stock has reached the fancy roll. The fancy should be set so that the point of the wire on the fancy reaches in to the knee of the wire on the cylinder. The surface speed of the fancy should be in excess of that of the cylinder, in order to raise the stock on the wire. The fancy stripper is usually run the same speed as the other strippers. The speed of the doffer depends in a large measure upon the wise judgment of the carder.

Changing the speed of the doffer does not alter the draft, because when the doffer is speeded up, the feed rolls are in turn speeded up, through the side shaft.

A 60 (English count) wire is usually used on the cylinder, and 80 wire on the doffer. The workers and strippers are optional. The fancy roll is covered with a special wire with leather foundation, the wire being about 1⅛ inch long.

Many mills fail to realize the important part a set of full roller cards and a twister head frame can play in the production of coarse yarns. Where cotton is handled about 45 times in a regular ring spinning mill, when using full roller cards and twister head frames, the operations could be reduced to about ten times; thus you see a remarkable saving in operations, let alone costs of repairs and wages and power transmission costs.

Well, I guess that is enough food for thought, and I hope sincerely that "Contributor No. 454" has gained some benefit from it. If not, I hope I can elucidate more fully, provided he furnishes more questions. H. D. (MASS.)

EDITOR COTTON:

In response to "Contributor No. 454," in regard to clothing on a roller and clearer card, with fancy, I cannot advise with reference to fancy roll speeds, but I am pleased to give below the kind of clothing used on the various parts by an up-to-date mill:

Breaker card: Wool pitch. 31, C.W.C., on doffer; 30, C.C.W.C., on cylinder; 30 C.W.C., on workers; 28 C.W.C., on stripper; 30 on fancy roll clearer; and 29s on fancy.

Finisher card: Wool pitch, 31 C.C.W.C., on cylinder; 31 C.W.C., on workers; 33 C.W.C., on doffers; 30 C.W.C., on strippers; 30 on fancy and fancy roll clearer.

These are, of course, the American number of wire. The English numbering, which is what he seems to be using, as he says he has an 80s on the cylinder, will be found in the following table, with the corresponding number of the American method of numbering.

English Counts	Points Per Sq. Ft.	Amer. No. of Wire
60s	43,200	28
70s	50,400	30
80s	57,600	31
90s	64,800	32
100s	72,000	33
110s	79,200	34
120s	86,400	35
130s	93,600	36

I trust this may be of help by way of comparison.

CONTRIBUTOR NO. 444.

Some Questions on Bunch Builders.

EDITOR COTTON:

Some few years ago the writer experimented to a small extent with bunch builders, but did not find them very practical at that time. However, there may have been a considerable advance in the perfection of this device since then, and I would like to have some of your readers who have had experience in operating bunch builders answer the following questions:

Approximately what percentage of weave mills operate bunch builders?

Is there any point of the construction of goods or yarn that would especially favor or that would prohibit the use of bunch builders?

How long would the spinning frames have to be stopped to install bunch builders?

With the installation of bunch builders, how much bunch would be required on the bobbins in running 20s to 30s?

Will the installation of bunch builders require extra help in the weave room?

Can they be operated automatically successfully?

What percentage of thread waste will they save?

Are bunch builders practical?

Any additional information regarding bunch builders which is not specifically asked for in these questions will be appreciated. T. I. P. (ALA.)

Preventing Shedding at the Loom.

EDITOR COTTON:

In the July issue of COTTON "W. (S. C.)" asks the readers to explain how to overcome shedding at the loom when weaving domestic broadcloth. During the past year we have woven in the neighborhood of 2,000,000 yards of broadcloth, and perhaps the suggestions I offer may help the inquirer to eliminate this trouble.

I presume that "W. (S. C.)" is weaving his broadcloth with an early shed, that is with the harnesses level when the reed is about 2.5 inches from the fell of the cloth. Also that he is using at least four shades of harnesses—six would be better.

When we first started to weave these goods, we had a lot of trouble with shedding at the loom. Lint and fly were everywhere—on the lay, reed-cap, arch, loom sides, crank-shaft, cams and cam-shaft. We had always prided ourselves that our size was well-cooked and with the proper relation of viscosity and fluidity, but there was evidently something in the nature of the weaving of these goods that called for more care and attention in cooking the size. Our overseer of weaving laid the blame on the sizing compound and the dresser wasn't so keen about it either, so we decided to use something else—we decided to try tallow. We found that right in our own mill town we could get mutton tallow of a very good quality; free from urine and all foreign matter. The first set of warps, 24,000 yards, showed a remarkable improvement. Besides eliminating a great deal of shedding the production was increased, and the weavers were better satisfied. Still, we were of the opinion that the shedding could be further reduced.

About that time a young salesman came to us with a new starch, which I will refer to as *X*. He wanted us to give it a trial and we let him come into the mill and mix and cook the size for one set. His *X* didn't wholly replace our starch, he simply deducted 25 per cent of the amount of starch we had been using and replaced it with one-half that amount of *X*. That is, where we had been using 100 pounds of potato starch we used 12.5 pounds of the *X*, 75 pounds of potato starch and the usual percentage (12 per cent) of mutton tallow.

This *X* did all the salesman claimed and more, too. The shedding was reduced to a minimum, the production increased, and the cloth had a better feel and appearance. If "W. (S. C.)" is sufficiently interested in this *X* to give it a trial, I shall be pleased to furnish him with the address of the manufacturer. I am not trying to push a sale—I simply want to pass a good thing along to a fellow mill man.

With regard to using mutton tallow in preference to beef tallow, I will state first that perhaps this is owing to a condition that can best be described as being "local." When I first started to use tallow I made no discrimination between the two—one barrel might be beef tallow and the next mutton tallow, as received from the packing house. But, as time went on, it was my experience, and later my candid opinion, that the mutton tallow increased the fluidity—retaining the viscosity—and also aided in retarding congealing better than the beef tallow, and thereby made a smoother yarn.

No doubt the fact that I have been brazen enough to state that we use mutton tallow will raise a storm of ridicule among some of COTTON'S readers. All well and good, but I may well add that we are not using mutton tallow because "our grandfathers used it," but because the "grandsons" have found that it produces results, consistent with quality and production, when used properly. That's what we are after today—results. CONTRIBUTOR No. 521.

EDITOR COTTON:

In trying to make a reply to the question of "W. (S. C.)," with reference to shedding at the loom on 100x60 domestic broadcloth, will say that he should use a longer staple cotton than on ordinary prints. His slashing has a great deal to do with shedding at the looms. I would recommend thin boiling starch in preference to thick boiling. It would also pay him to go over his looms and take all unnecessary friction off of his yarn. Y. W. (S. C.)

The Origin of the Breaking Strength Constant.

EDITOR COTTON:

The origin of the figure 1900 as used in Draper's formula for figuring the breaking strength for standard carded warp yarn can be easily explained. (This information was requested in a question in "How Other Men Manage" some months ago.) And so are the figures 2600 for combed yarn and 13, to be subtracted from the 1900 in the case of **soft** twisted yarn.

First of all, it must be understood that these figures were arrived at only after extensive tests, as explained in "Textile Texts." Tests were made, data tabulated, curves drawn, and the nature of the curves observed. Then, from the equation of the curve, by substituting the known factors, the constants were calculated. To be sure, there are many different ways of arriving at the same result, just as there are many different ways of approaching a city. But I will give the one that is most readily understandable.

The first step was, by actual testing, to get the breaking strength in pounds for 120-yard skeins of carded yarns for different counts of yarns, say, from 10s to 40s. The second step was to arrange the results in tabular form somewhat as follows:

Counts of Yarn	Break in Pounds
10s	So many pounds
11s	" " "
12s	" " "
13s	" " "
...	.. .. ..
40s	So many pounds

The third step was to multiply the count or number of yarn by its own breaking weight in pounds and arrange the products in a third column. It will be seen that all these products are *nearly* equal to a constant, 1900. For carded warp yarn the difference between the actual tested results (the products) and the constant 1900 are nearly equal to the count of the yarn. But for soft twisted yarns the products are found to be less than the constant 1900 by an amount which nearly equals 13 times the count or number of the yarn. The formula is something like this:

Count $\times$ breaking weight $=$ 1900 $+$ count $\times$ constant.

Here the constant may take positive or negative value ac-

cording to the twist multiplier used. The reader is also referred to the article, "How to Design the Breaking Strength of Cotton Yarns," on page 713 of the May, 1924, issue of COTTON, where the factors of the equation are more fully discussed.

The constant 2600 for combed yarns is found as above explained.

It must be remembered that this is only an approximation and is true only within certain limits.

H. H. Y. (CHINA)

Hypochlorite of Soda.

EDITOR COTTON:

"What is the cheapest way of making hypochlorite of soda, either by electrosis or by mixture, and is it better than bleaching powder, anyway?" was a question asked me recently.

I replied that in my opinion, for some classes of work hypochlorite of soda is no better, and much more expensive than chloride of lime (or bleaching powder). Of recent years bleachers have given close attention to the rapid developments made in bleaching with hypochlorite of soda, sometimes erroneously referred to as electrical bleaching from the fact that in some mills hypochlorite liquors are made by decomposing a solution of common salt with the electrical current, which is a desirable method in large mills where the electric generators would otherwise be idle during the daytime, and where electricity can be generated and made use of at from one to two cents per kilowatt hour. Generally, however, sodium hypochlorite is prepared easily by mixing together a solution of full strength bleaching powder with a solution of soda ash which produces a precipitate of carbonate of lime, which is of no value, while the clear solution from this reaction is a strong hypochlorite of soda liquor, which when diluted with water to the strength desired is ready for use. It is true that bleach liquor is thus easily produced, but it will only be a question of time when the electrical means of producing it will be common enough in all mills where cotton is bleached.

The following formula is the one generally used for producing hypochlorite standing at six to seven degrees Tw.:

Common bleaching powder.....100 pounds
Water ..... 50 gallons

Mix in such a way that no lumps remain.

Asecond solution is made by dissolving 60 pounds of common soda ash in 25 gallons of hot water, and after the solution is complete, add 12½ gallons of water.

These two solutions are mixed together in a tank of about 100 gallons capacity, stirred well and allowed to settle, when a clear liquor is drawn off carefully into another tank. The white residue in the first tank is washed off by changes of water, allowing it to settle after each addition and drawing off into the tank containing the original clear solution, and bringing the total volume of the latter up to 190 gallons.

This solution will always contain a small amount of lime which can be removed by a further addition of four pounds of sal soda dissolved in a small quantity of water, stirring, when the remaining traces of lime will settle out. Acetate of soda is better because it must always be remembered that a solution that is alkaline will not bleach so well.

The use of sodium hypochlorite has a distinct advantage over the ordinary bleaching powder system in that no lime can remain in the goods, and that washing is more readily accomplished, and that souring with vitriol has then no drawbacks. It is also softer. W. B. (MAINE)

Picker Settings and Comber Waste.

EDITOR COTTON:

Replying to the questions of "B. S. (N. C.)," the setting between the beater and the feed rolls is seldom changed, as there is no need for it. When starting up a new picker, the beater boxes should be lined up first, and the beater tried by hand to see that it turns freely. The boxes are set so there is no binding and then tightened as tightly as possible so they cannot slip. As the beater revolves very rapidly, the following settings are obtained by moving the feed rolls and not the beater. Once this is made fast it should remain so until new boxes are necessary. The feed rolls are moved up to within ¼ or ⅜ inch, depending on the weight of lap fed. The heavier the laps, the more space must be allowed. The setting is done between the bottom feed roll and the beater, and is usually done with a gauge, made the desired thickness, which is slid along the space and both boxes set. With the beater set first and then moving the feed rolls up to it, any slight discrepancy in setting will do no harm as the feed rolls turn so slowly. The only point to consider in this setting is the weight of cotton fed, and for a picker running four 16-ounce laps, ⅜ of an inch is a good setting. Sometimes 1/16 inch larger gauge is used on the breaker picker than on the intermediates and finishers, as the bulk of cotton is more matted on this machine than in those succeeding.

While discussing the percentage of waste removed by a comber, it is well to remember that the primary object of the comber is to remove short fiber and that the cleaning of waste is only incidental. Of course short fiber is waste, but the neps and trash that should be removed at earlier processes is often left for the comber to remove, and when the yarn begins to show up badly the comber is made the goat and the waste percentage is jumped up. It is probably on this account that the machinery builders have made it a very simple setting, to change the waste percentage, so that they can sell their combers.

Before discussing this setting it is well to bear in mind that the only time the percentage should be changed is when the cotton is changed, that is, using a cotton that has more or less short staple than that used previously, or when the yarn is too weak and the breaking strength must be increased, then it is excusable to go back to the comber and take out more short fiber, if the other conditions of manufacture have been found correct. Of course it is evident that the waste percentage should be as low as possible to obtain the desired break in the yarn, and if the cotton runs fairly even staple, the percentage can be lower than when a cotton of varying staple is used. Don't interpret this as a variation of finished staple, as we all know that this cannot be mixed. I mean simply the amount of staple that is under the average length.

The top combs are adjustable so that they can be made to descend deeper into the fringe of cotton, or raised out of it some, and thus increase or decrease the waste percentage. The lower they are set the larger the waste percentage. They can be raised to a loose 14 gauge, if neces-

sary, and this will usually give as low as 12 per cent waste, depending of course, on the other settings. They can be lowered until they just clear the half lap and segment, but this depends on the condition of the needles.

The waste can also be reduced by feeding earlier, but this is limited by the condition of the piecing-up, and if carried to excess, causes a bad piecing-up. About 3 per cent up or down is the extent of change consistent with good running work.

By changing the angle of the top comb and nipper knife, the waste can be changed, more angle giving more waste, but this is limited by the settings of the feed roll and cushion plate, as there may not be room to move these much. However, a slight change here makes 5 or 6 points on the percentage.

As "B. S. (N. C.)" has inquired only for settings to decrease his waste, he may be set too wide for the cotton he is running. It can readily be seen that if the distance between the detaching roll and the cushion plate and the feed roll is too great, that a lot of good fiber will go through into the waste. The best setting here is to set the cushion plate from the detaching roll 1/16 of an inch under the staple run, and the feed roll from the detaching roll 3/8 of an inch more than the staple. This will give a close setting, but can be varied from experience, then if the waste percentage is still too high, the other settings must be resorted to.

The fact that "B. S. (N. C.)" wants to reduce his waste shows his work must be satisfactory, and the only thing that may need correcting is the width of his settings for the staple he is running. If he will give the staple he is running, the weight of his laps and comber sliver, the kind of comber and the waste he wants to take out, perhaps more direct information can be given on this subject.

M. W. H. (MASS.)

EDITOR COTTON:

Replying to "B. S." in the August number of COTTON, who asks what the three principal points are governing the setting of the beater to the feed rolls on a cotton picker and why. Also what settings and timings can be changed and how should they be altered if it is desired to decrease the waste percentage removed by a comber, will say:

What I consider the three principal points covering beater setting is (1) length of stock and its characteristics; (2) amount of cotton fed in, or to the beater, and quality desired; (3) type, speed and working qualities of the beater.

The reason why the foregoing points are what I consider the three principal points that govern the setting of the beater to the feed rolls is, that a great deal of damage can be done at this setting point that cannot be overcome once the cotton has left the picker room.

The distance from beater to feed rolls is governed practically by the length of stock and many times by the amount fed to the beater. If the cotton is being fed heavy, the setting may be opened slightly at the expense of the weight being fed in, which can be done when production is very close to being the first consideration but is really a second consideration and the cotton coming very clean.

Then, the type, speed and working qualities of the beater must be considered, for we all know that the cotton should be given a sharp solid blow to knock the dirt from it, without injury to the fiber. To do that, all the points mentioned should be considered and the setting of the beater to the feed roll must be governed by these facts, due to the relation that exists at that point, which must be considered. Probably a great deal more could be said, but the points mentioned would be involved, and I believe I have covered the question, briefly but fully, as to what the three points are that govern the questions asked by "B. S."

Replying to the comber question as to what settings and timings should be used and how to decrease the waste percentage will say: He does not state the make of the combers to which he is referring, so to be sure my answer covers his question, I will give the settings and timings needed covering all the well known makes and those extensively used thereby, hoping to make clear to him the information which he seeks. On Whitin combers, raise the top combs and take the angle out; raise the nipper knives and take the angle out. Feed earlier. The latter method is the quickest way and is generally resorted ot. Set the nipper plate closer to the detaching roll if space will allow it.

On Heilmann combers: The settings and timings on this machine for a waste decrease is as follows: Raise the top combs and take the angle out of them. Set the top combs to drop later. Set the cushion plate nearer the steel detaching roll. Feed earlier and nip earlier, and if the decrease is not sufficient and quality is of second importance, then raise the nipper knives.

Nasmith combers: The settings on this machine to decrease the waste is, set the nipper plate closer to the steel detaching roll. The distance of the bottom nipper plate to the steel detaching roll is the main factor in determining the length and amount of waste, and if a big change is made in waste percentage, this setting should be altered. I would recommend it for a change of over one per cent. Raise the top combs, but if a double top comb is being used remove the small comb blade, for by doing so it may not be necessary to raise the top combs. Take the angle out of the top combs if there is over 10 degrees of an angle, for 10 degrees on a Nasmith comber is all that is needed even in the highest waste percentage wanted, for there is no need whatever to resort to angle on this machine. (It is a drastic method.) If the waste percentage is not sufficient when the nipper plate is as far as possible from the detaching roll then drop the top combs a little. Top combs can be set a little later, but not later than index number 13, and I would only recommend that on short cotton and low waste percentages. Set the top leather detaching roller as close to the top comb as possible without rubbing or striking say 1/32nd of an inch; otherwise, useless waste is made.

If working cottons from 1¼ inch up, time the steel detaching roll to back off a little later. It may be done as late as index 1¾, but not too late, for a poor piecing may result. The reason I mention the foregoing timing to decrease the waste is, if long staple cotton is being combed, backing off at index number 1, as is generally advised, then part of the sliver is being started to back off or returned, ready for the next piecing before the last two or three rows of needles on the half lap have passed behind the tin waste chute. Consequently, these rows of needles catch the tail end of the fibers and carry them away, for it must be remembered that the detaching roll is backing off and at the same time releasing their grip on the fibers, which

give the needles a better chance to take these fibers away. So if working a long staple cotton and by backing off later the waste is decreasing and production increasing, at the same time attaining the necessary quality—if the tail end of the fibers do not escape the last rows of needles on the half-lap by backing off later—then I suggest moving the cylinders on the cylinder shaft forward from ½ inch to 1 inch at index number 2½. In carrying out this suggestion the time of the nipper knife to open must be changed, for when the cylinders are moved forward the nipper knife must close before the half-lap penetrates the tip of the lap hanging from the nippers, or the half-lap needles will pluck the cotton from between the nippers.

A man must thoroughly understand the actions of the comber in question to try the latter suggestion, for what he has gained at one point he may lose at another. However, it is well worth trying in order to get those long fibers that are in the waste in with the draw-box sliver and get yarn price for them instead of the waste price.

I have always contended that the time the back steel detaching roll backs off was too early and the setting on the cylinders were too wide from the steel roll on a Nasmith comber. Now I find my contentions have been proven to be correct since the Nasmith "twin-six" comber has been introduced to the cotton trade, for the settings and timings demonstrate it. Also, my various statements in the September, 1924, issue of COTTON about the lengths being combed first by the half-lap and then by the top combs, the latter having more work to do, with less needles than the half-lap, etc., will be proven in time and there will be no top combs. If there are any they will do less work than they do at the present time. I do not wish to say any more about this at the present time, but just mark my words and watch out for a comber coming out with two half laps attached to it.

Maybe some of the readers will say that my statements are contrary to what I wrote in a previous issue of COTTON regarding the method of increasing and decreasing the waste percentage, but I am assuming that "B. S." is making a big decrease in waste and quality is a secondary question. If such is the case he will have to raise the top comb and nipper knife, and on the Heilmann type comber he will have to take the angle out, owing to the detaching method and space at that point. However, on the Nasmith, the nipper plate alone can be moved, of course resetting the top combs again, making a big change in the waste percentage.

The picker and comber questions which "B. S." has asked leads one to think that he is making a change in cotton; that is only an assumption. I trust that my letter will be of help to him in some form or another.

JOCK (MASS.)

Paying Piece Rates for Warping.

EDITOR COTTON:

We pay our warper tenders by the piece. When we started out we tried to pay by the beam, but this was unsatisfactory, as we run different numbers of warp yarn, and we would have more wraps on a beam of one number than another. We then started in paying the girls by the wrap. Our regular numbers are 12½s and 23s. We know that a beam of 12½s contains four wraps, and a beam of 23s contains seven wraps. We have devised a card giving the numbers 4, 6 (for another number) and 7, in series under each day of the week. When the man takes off the beam he punches a 4, if it is a beam of 12½s, or a 7, if it is a beam of 23s. These cards are taken up and it is a simple matter to enter this on the time book.

H. S. (GA.)

Uneven Numbers, Irregular Weights.

EDITOR COTTON:

I have often been asked the question, "Can you tell me what makes my numbers vary so?" And my answer has always been, "I can tell you a great many things that will cause variation, but I don't know what is making yours vary."

There are numerous causes for variation in numbers, and as it is impossible to keep them from varying some, the better the carder and the condition of things in his department, the better will be his average.

There are very few mills in this country that have the facilities, and take the time to mix and blend the cotton as it should be. As we all know, at times we have to take cotton that has excess moisture in it. At times it happens that a bale which has been out in the rain for several days will get into the mix. If the cotton gets into the mill in this condition it will dry out some in each process, and by the time it reaches the roving frames it will be too light and will cause variable numbers.

In England they are more particular with their mix than we are here in the United States and they seldom have variable numbers caused by allowing very damp cotton to get into the mill. The cotton they use comes to them mostly from all sections of this country in ships that won't carry it unless it is pressed into a very small package and known as high density. This necessitates having a very large mixing room so that the cotton can be opened a few days before it is used where it can expand or contract to its normal shape. They also have another object in view when making large mixes, which might be mentioned, and that is, to take the different grades, which means different prices, and blend them together so they will get a uniform product at a uniform cost per pound. In this country the majority of manufacturers do not pay any attention to this end of the business.

A great many of the mills in this country have very little warehouse space to store cotton, and when they purchase a certain lot of cotton from a certain section, they are forced to use it before they can start on another lot, and as cotton varies considerably in character, one lot of cotton will not draft the same as some other, which helps to make the numbers vary. Besides, one lot may be fairly clean and the next lot may contain more dirt, which will affect the numbers also, but if a blend of two or three lots could be had the result would be much better. A large mix of cotton does not only get a uniform degree of moisture, but it also averages up the grade, the character and the general appearance of the manufactured product. One day's run of cloth will not be clean and the next day's run dirty.

The first cause for uneven laps in the picker room is the breakers, especially if they receive the cotton from the openers or feeders through an inclined trunk, as the fans

must be working properly or the cotton will go to the breaker in bunches, mostly all to one side of the machine. And when these laps are put on the intermediate we have one side of the evener trying to take care of a heavy sheet and the other side a light one, which results in a very uneven intermediate lap, as the evener is never at rest. Any obstruction in the inclined trunk will catch and collect the cotton and turn it loose in bunches and cause bad results. As there is no evener on the breakers it makes it very necessary that the machine be in first-class condition. The better the breaker lap the more perfect will be the intermediate and finish laps.

The intermediate is when the first evening process begins, and to end right, it should be started right. To get an even lap, the evener motion, especially the belt, must not be obstructed in any way, for if it is, the lap will have heavy, normal and light sections throughout its entire length, which will give the evener on the finishers a great deal more work to do. To get an evener lap on an intermediate or finisher picker, the draft gear should contain the right number of teeth to keep the evener belt as near the center of the cones as possible. The entire evener motion should be rigid and there should be no lost motion in any part of it. As the cotton passes between the plates operating the evener and the evener roll, it is very necessary that the plates press or condense the sheet properly to the roll, or the lap will be very uneven. The harder the plate presses to a certain extent and the more the sheet is condensed at the evener roll, the more sensitive will be the response of the evener motion to small changes in the thickness of the lap at various points throughout its length.

The average operative, if left entirely to himself will in time get very careless, and instead of joining the end of the lap running out with the lap he is putting on the apron as near together as possible without doubling, he throws them on the apron to suit his own convenience which makes the evener belt run to the end of the cones and stop and changes the weight of the lap at that section. He will also let one lap run out, leaving only three going into the machine, and while there is an evener, it will cause the belt to take its position so near the end of the cones if a light place passes it will go to the end of the cone and stop, and there is the same condition as before, which is a light place in the lap being made. This, in my opinion, is one of the principal causes for variable numbers, which I think I can prove later.

I consider it of great importance to weigh the breaker lap by the yard on each machine at least three times a week. They should be weighed by the yard for three reasons, namely, to see that the openers or feeders are functioning properly, and usually there isn't any knock-off gear on the breaker to give the same number of yards in each lap. Also the feeders will send different characters of cotton up with variable degrees of density which changes the weight per yard and makes it necessary to adjust the feeders to suit the cotton being used.

In making the finisher lap for the carding machines we can consider that it requires two scales. One of them the evener on the machine is supposed to weigh by pressure every inch of cotton that the blades presses against the roll. So it can be seen how important it is to keep the evener plates free and working properly to get laps that not only weigh right in the whole but by the inch or yard, as the average card makes 100 inches of card sliver for each inch of lap it takes.

As stated, I am going to prove that it is the variable weight per inch or yard and not the variable total weight that makes the greatest variation in numbers. Now suppose we have the following organization: net weight of lap 35 pounds; ounces per yard, 14; draft of card, 100; draft at first drawing, 5.50; 2nd drawing, 6.00; slubber, 3.50; intermediate, 4.50; speeder, 5.50. Not allowing any loss for waste the weight of the speeder roving will be:

$(437.5 \times 14) \div 100 = 61.25$ = weight of card sliver.

$(61.25 \times 6) \div 5.50 = 66.81$ = weight of 1st drawing.

$(66.81 \times 6) \div 6.00 = 66.81$ = weight of 2nd drawing.

$(66.81 \times 12) \div 3.50 = 229$ = weight of slubbing.

$(229 \times 2) \div 4.50 = 101.77$ = weight of intermediate roving.

$(101.77 \times 2) \div 5.50 = 37$ gr. = weight of speeder roving.

The net weight of the lap being 35 pounds, and considering the length as 40 yards, let's see what percentage a 37-pound lap will put us on the heavy side.

35 pounds = 100 per cent. 37 — 35 = 2 pounds excess.

1 pound = $100 \div 35 = 2.857$ per cent.

2 pounds = $2 \times 2.857 = 5.71$ per cent.

This changes the weight in grains per yard from 61.25 to 64.75, and with the card draft at 100 the card sliver will weigh 64.75 grains per yard.

Assuming that two 37-pound laps in every six find their way to the cards and each delivery gets two of them, the weight of the first drawing will be:

$64.75 \times 2 = 129.50$. $61.25 \times 4 = 245.00$. Total, 374.5.

$374.5 \div 5.50 = 68.26$ = weight of first drawing.

$68.26 - 66.81 = 1.45$ grains excess weight.

Then if the operative puts two of these in the 2nd drawing, the 2nd drawing will weigh:

$68.26 \times 2 = 136.52$. $66.81 \times 4 = 267.24$. Total, 403.78.

$403.78 \div 6 = 67.29$ = weight of second drawing.

$67.29 - 66.81 = .48$ grains excess weight.

This example shows that if two laps in every six is two pounds heavy it only makes the finished drawing about a half grain heavy per yard, which is a little over ¾ of one per cent.

If the lap is 40 yards long and weighs 35 pounds the ounces per yard will be $16 \times 35 \div 40 = 14$ ounces.

If 14 ounces = 100 per cent, 1 ounce = $100 \div 14 = 7.14$ per cent. Then for each ounce that the lap varies per yard, the percentage per ounce will be 7.14. This will make each process that much heavy or light.

$37 \times 107.14 = 39.64$ grains.

$39.64 - 37.00 = 2.64$ grains excess weight in 12 yards.

This is quite different from the results of the lap which was two pounds heavy, so you can see at a glance that the weight per yard is of more importance than the weight per lap. Of course the doublings at the drawing helps to even one as much as the other, but the variation per yard is so many hundred times greater than the variation per lap that two sizings of roving very seldom weigh the same.

The variation at the cards is greater per yard than at any other machine in the mill. This is caused mostly by the

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variation per yard of the laps, but with perfect laps there would be some variation, due to the fact that all cards do not take out the same amount of strips, motes and lint. But this is insignificant compared with the light and heavy places in the lap, for if the settings are alike on all the cards the variation due to their fault will be less than one per cent.

There are times at the cards when almost anyone would let some bad work go to the drawing. This usually happens in dry windy weather when the ends of sliver keep breaking on the web, won't go through the calender roll, and the doffer deposits half of it on the floor and sends the other half through the calender roll. In some instances this light drawing will hold the stop motion spoon in place and the result will be a can or part of a can of drawing at least five grains light.

This evil is caused mostly by getting too much waste in one lap. This can be overcome to a certain extent by mixing the waste systematically in the picker room. Six per cent waste will very rarely if ever cause a lap to split, but all in some of them and none in the others will invariably give trouble. Another reason why the waste should be put back uniformly is because that with the same drafts on all machines the waste will come out heavier but weaker, due to the fact that it has been re-worked so much.

A singling or a delivery with one end missing or out at the back of first drawing does not make so much difference in the end, but with one out of the 2nd process makes the finished drawing about 10 grains light per yard and with a draft of 3.50 on the slubber using 67 grain drawing, the slubber would be over 30 grains light in 12 yards.

If the calender roll surface speed of a drawing frame is too much to suit the surface speed of the front roll, the sliver will be stretched or pulled partly in two, especially if the trumpet bore is too large or worn out, and when it goes to the slubbing machine it will either break back or make a light place in the roving. The tension between the calender and front roll should be just enough to keep the sliver from going through the trumpets in lumps. The least bit of draft should be sufficient. The trumpets should be bored to suit the weight of drawing that is being run and each trumpet should have the same bore or there will be several degrees of tension throughout the room which will cause a variation in the numbers.

There are very few mills that give the compensating gear and the trumpets the attention that they should. On some drawing frames the compensating gears are of small denomination with large teeth, and if the ends run a little too tight and the gear is changed one tooth it would cause them to run too slack. In a case like this it might be necessary to change two gears even if they had to be ordered from the machine builders or made in the shop. Any time or money spent to keep the calender roll speed right is a good investment to any mill.

Dry sluggish rolls, tight or too slack tension, and careless operatives all tend to cause variation in numbers. If the tension is too tight the roving will be stretched; if too slack, the operative takes up on them and nearly always gets them too tight. A careless operative will take up on his tension always before going for the fixer to change the gear.

A doubling at the slubber will run at least a half intermediate bobbin before it gets large enough to break down, which means that all short doublings get through and into the finished product. There is no excuse for letting doubles leave the slubber, as they are caused mostly by one end breaking and running into the next or another end near by and can be easily seen by the slubber tender when he stops the frame. A doubling at the slubber is quite different from drawing that is heavy as it is twice as heavy as the regular roving, and when it runs through at the intermediate it gives the same results as if three ends of slubbing were used instead of two. Every doubling that can be kept out of the work will make the work run better and improve the quality of the yarns and cloth.

The finer the roving gets the more it needs attention, and no matter how perfect the work may be that the roving frames receive, if they are not kept in proper condition and the piecings done properly, the spinning and weaving department will have to suffer on account of it.

Creeling in the speeder room is one of the most important things in the manufacture of cotton if uniform yarns are required. Considering the amount of bobbins creeled daily, if they are not connected properly the result will be thousands of heavy places in the yarns from one to several feet long. This and bad creeling in the spinning department is why so many heavy ends show up in the cloth and give it a bad appearance. The ends of the roving should never be lapped, but should be twisted together at the end. All the time spent in teaching the operatives how to piece the roving is labor well spent.

A good rule to use in figuring out the layers per inch up and down the bobbin is to multiply the square root of the hank by 10. Example: 4.00 hank roving.

The square root of 4 is $2^2 \times 10 = 20$ layers.

The lay of the roving on the bobbin plays an important part in keeping the tension right. Unless the roving is laid on the bobbin properly, the tension will not be uniform throughout the doff and the result will be stretched roving and bad spinning, which in the end produces bad cloth.

Bobbins of different diameters can usually be found in most any mill. This is caused mainly by ordering new bobbins from time to time from different concerns, sometimes through cases of necessity, but mostly to save a few dollars, and after a few years the bobbins vary to so many different diameters that it is almost impossible to get an even tension on each end throughout the frame. It is true that the bobbins even up themselves through the agency of the tension to a certain extent, but this does not help much as the worst of the stretch comes at the starting of the doff. The operator usually keeps the tension too tight in order to get the bobbins of a smaller diameter to run. This trouble can be overcome to a certain extent by separating the different sizes, painting the heads differently and using them on certain frames. But it is much better to either throw out the small bobbins or turn the large ones to a corresponding size providing they contain sufficient stock to admit of it.

Bad skewers and broken creel steps usually cause the most stretch at the spinning process, although a dirty or blunt end skewer can do the same thing. The little things, not the large ones, cause the most trouble and they should be looked after very carefully, as the large ones will take care of themselves.

A chain is only as good as its weakest link and so are a mill's numbers.

B. B. (LA.)

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Paying for Spinning by the Hank.

EDITOR COTTON:

For the information of "H. K. (N. C.)," who asked some questions in a recent issue of COTTON relative to paying for spinning by the hank, will say that the hank clock is about the best thing I have ever had come into the spinning room. I have my spinners run entire frames, from one to six frames, or whatever they can run.

I believe it is best to have a different price for the different numbers of yarn. Also, when the frames have a different number of spindles, the doffers should be paid by the hanks the spinner turns off on their section. In that way they will not keep the frame stopped too long in doffing.

I believe the section man should be paid by what the spinners make on their sections. In answer to "H. K.," it might be practical to pay the overseer and his second hand by the hank if the room were not on too many numbers and did not have to change too often.

As to the benefits derived in using the hank clock for paying in spinning, in the first place, the spinners receive better pay; they look after and keep up their work better with less attention required from the overseer and fixers. They report right away when their frames should be repaired, and also complain if the doffers keep the frames stopped too long. I might say also that if a spinner wants her frames started up a few minutes earlier every day the doffers are always ready to do it as they are both the gainers. I had a case some time ago of a spinner who got in the habit of coming in late, so I had the section man not start her frame until she came. When payday rolled around, a girl who had ten sides made $10.35, while the girl who had been coming in late made only $10.00, although she had eleven sides. She wanted to know the reason, and it was easy for us to explain that the girl with the ten sides had kept her frames running and therefore had turned off more hanks. So you see it is a benefit because it tends to get the spinners and doffers on time.

I have about 60,000 spindles, running from 20s/2 to 80s/2. My foremen take up the hanks at the same time every night, and we have a clerk who figures out the hanks and pay cards every week, and also, we get a correct account of the production turned off every week.

CONTRIBUTOR NO. 442.

EDITOR COTTON:

In reply to the question regarding the advantages of using the hank clock as a basis of pay in the spinning, I would like to say that, from my experience, it is the only practical and efficient system to use. In the first place, we are all human and like to see the weekly enevelope as thick as possible, hence if every turn of the front roll means more money on pay day, those rolls are going to turn every possible minute. I have seen spinners being paid by the side stop off a frame for half and hour or longer if the work happened to be going a bit tender, in order to get caught up, and again to get the rolls and clearers picked. If the spinner is paid strictly by the piece, those frames are going to run, or some one will know why.

The same thing applies to the human element in doffers. A lot of production can be lost in doffing, which is pretty hard for the overseer to catch, but where you have spinners, doffers, and fixers, as well as second hands and overseer all pulling for production, a decided improvement will be seen in the quality and quantity of yarn and the general spirit of cooperation in the entire organization of the room. For this reason alone, I would pay fixers, second hands, and overseers by the hank.

I have in mind a large mill that was continually waiting on warp, in fact a number of looms had been covered with burlap, and several methods had been discussed to relieve the situation, such as adding frames, increasing speed, or putting on filling wind, these being impractical at the time, due to conditions, it was decided to put the spinning room on a hank basis, with the result that the spinning is now over-running the weaving, and the quality is improved in like proportion.

From a standpoint of efficiency a more uniform speed will be maintained. We all know that belts require constant care to prevent slipping or slackness. The overseer can glance over his clock reading at the end of the day and tell at once which frame has come short, also by getting his total hanks or 100 per cent, he can figure each day exactly what production he is getting on each style, or for the entire room.

As to the method of paying the spinner, the rate per hank is figured on the basis of the side, so if the spinner runs around the frame the clock reading is given for both sides. In other words, if the frame runs six hanks each side is given six, regardless of whether one spinner is on both sides or different spinners.

It is necessary to have a different rate for different numbers, both warp and filling. Also, it will require a different rate on doffing, as on fixers, second hand, and overseer. This rate, of course, to be based on the present weekly pay. In the last three mentioned rates, I would suggest that say 95 per cent of a possible 100 per cent in hanks be divided into the weekly wages, in order to get a hank rate, and at the same time give the men a margin to increase their wages by increasing the production. This 95 per cent is assumed, as an example, since the actual figure will have to be governed by the yarn numbers, size bobbin, ring, and frequency of doffing. The length of time between doffs will have to be considered in the making of rates for spinners and doffers as well as the speed of the frames.

CONTRIBUTOR NO. 700.

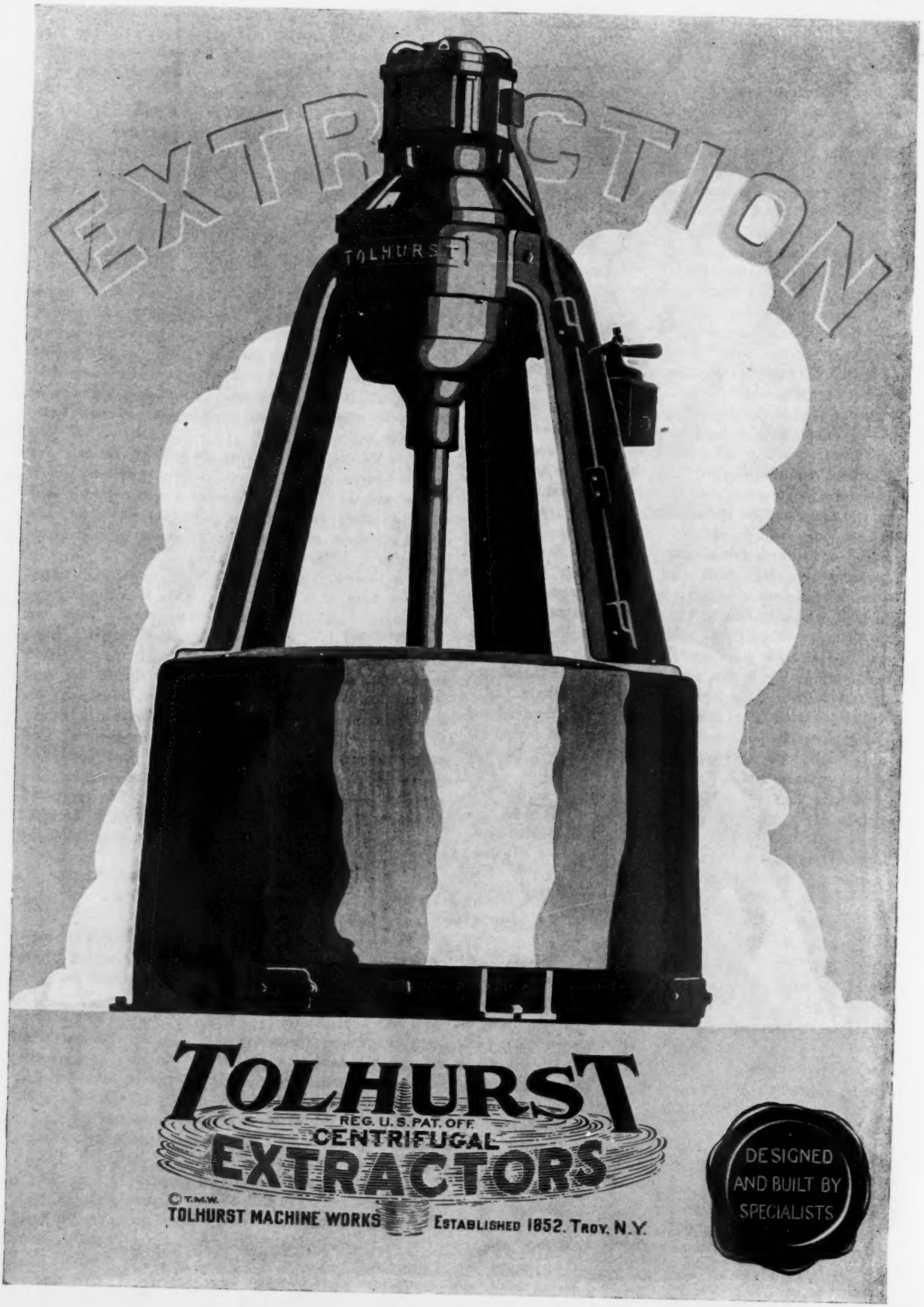
EDITOR COTTON:

Answering the questions of "H. K. (N. C.)" with reference to equipping spinning frames with hank clocks, I have had several years' experience with this application.

I will say in the outset that in paying by the hank, a mill gets what it pays for. I like it better to have doffers and spinners on frames instead of sides, for the reason that they do not have as much territory to cover on frames as they do on sides. I think it is better to have different prices per hank for different counts of yarn where the counts differ two or more, because the coarser counts will have a higher front roll speed and will produce more hanks than fine counts.

The operatives who should be paid by the hank are the section men, spinners and doffers. I do not believe it advisable to pay the overseer and second hands by the hank, for the reason that in the rush for quantity, quality will be neglected.

Before equipping our spinning with hank clocks, we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were getting ninety per cent production. Since equipping the frames with clocks, we are getting ninety-eight per cent production, figuring the production by the speed of the front roll, without running through the noon hour. It is also possible when paying by the hank to run through the noon hour. I know of a very large mill that does run through the noon hour, without any trouble at all, and the results secured are great. C. R. (S. C.)

Reducing Fly at the Cards.

EDITOR COTTON:

In answer to the question of "E. A. G. (N. H.)" in the "How Other Men Manage" department of the June number of COTTON in reference to card settings I would be glad to have him try the following:

Feed plate from licker-in, 10; licker-in from cylinder, 7; mote knives, 10 top; bottom, 7. Back plate, 34 top; 22 bottom. Front stripping plate, 34 top, 22 bottom. Cylinder screen, center, 34; front, complete gauge. Flats, 7; doffer from cylinder, 7; doffer comb, 15; angle mote knives, 15; licker-in screen, 1/8 inch from licker-in.

If "E. A. G.'s" cards are in good condition and are receiving their grinding regularly I think he will get good results from these settings. We make a 40-pound lap and make a 50-grain sliver about 12.5 ounces per yard on the laps, and we use only two processes of pickers.

N. C. M. (MASS.)

EDITOR COTTON:

In the June issue of COTTON I notice that "E. A. G. (N. H.)" wants to know how to reduce the amount of fly at the cards. This is a very interesting question for the readers of COTTON. A book could be written on the subject.

The amount of fly from any cotton card should be judged by the length of the staple. "E. A. G." is running 1 1/8-inch stock, so if the staple in the fly is found to be no longer than 3/4 of an inch, no matter how much is made, the card is doing its work properly. On the other hand, no matter how the amount of fly is extracted from the card, if any of the fibers in the fly measure in length the same as the raw stock, then the fly is excessive.

The majority of carders know that the loss of most of the cotton known as fly is beneficial, because it makes the cotton which passes forward more uniform in length, and besides, if the short cottons, too short to be worked, are not removed at the card, they will leave the sliver at other processes and fly about the room. Here is where the good carder counts; he has room and opportunity to give the company the best that is in him by removing this so-called fly at one time and preventing the loss of good cotton at another time.

The carder should think more about how he can save cotton for his company than of the settings. What I mean by saving cotton is, having the card set so that only the short fibers are extracted. In trying to save cotton and allow the short fibers to pass the card, one has a condition similar to that of mills running waste. In other words, instead of accepting a certain setting as the best one, do a little experimenting with the idea of doing all that can be done to benefit other departments.

We set the front knife plate nearer the cylinder to reduce the amount of flat strippings, so the principle is the same at the back of the card. The less fly desired, the closer one must set.

The setting of the plate has nothing to do in the matter. If "E. A. G." wishes to extract less fly let him set all the screen almost to touch.

The mote knives set at 7 and 5 is okeh, but the other settings are too wide. Set the licker-in screen to a 5 gauge; also, the cylinder screen as close as possible.

However, although I know the foregoing is the proper remedy, it is not always advisable, due to the trouble it may cause in the proceeding processes. WASH (R. I.)

Standardizing Cloth Weights.

EDITOR COTTON:

At our mill we have recently begun a method of testing, to determine the percentage of water in our cloth as it leaves the mill, which I thought might interest your readers.

We begin by taking a sample of the cloth as it is in the cloth room, ready to be shipped, and weigh this to determine the weight. Then it is put in our laboratory, where it is subjected to approximately 65 per cent relative humidity for several hours, and another weighing made. Then we put it in a drying oven and put it in a bone dry condition, when it is again weighed. From these figures we can get the exact amount or percentage of water in the cloth.

Following are some illustrations of our finds. On one of our regular numbers, we found the sample from the cloth room to weigh 5.50 ounces. After remaining in the laboratory, it weighed 5.51, showing .001996 per cent of moisture gained under those conditions. After it was dried bone-dry, the weight was 5.035, which showed an actual moisture content in the cloth in the cloth room of .084545 or approximately 8 1/2 per cent.

Naturally, a higher sley goods will take more moisture, as is indicated in the following: A sample of another construction with a high warp count, in the cloth room, weighed 3.38 ounces. After going into the laboratory, it gained to 3.39 ounces, or .002949. The weight in a bone-dry condition was 3.06 ounces, giving a moisture content of .094674 or about 9 1/2 per cent.

We record also the data of the test, and the weather conditions. The form shows an illustration of the way in which this is recorded:

Style No	Conditions	Wt. at Cloth Room Temp., Ounces	Wt. at Lab. Temp., Oz.	Per Cent Moisture Gained in Laboratory	Wt. After Drying, Oz.	Per Cent of Water	Date.	Weather Condition
92	38—64x60—5.60	4.655	4.665	.002143	4.265	.08378	6-12	Clear
43	35—80x80—	2.775	2.78	.001798	2.525	.09009	6-15	Part Cloudy

From my standpoint as superintendent, the biggest advantage which comes from the figures derived from these tests is that should our work run heavy, I have a definite basis for determining just what the cause is. In other words, the original tests we made on the various constructions were made at a very dry time, when the water content would be practically at a minimum. Then, when a damp spell comes along, or the cloth should run to the heavy side, all we have to do is to take a sample from the cloth room,

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dry it out bone-dry and ascertain the weight, to figure the amount of water in the cloth. Checking this against our base figures, we can tell whether the percentage seems about right, or whether it is high. If the additional weight proves to be an extra amount of water in the cloth, we know it is not necessary for us to make any changes in the machinery, as it will adjust itself. But should the water content show up normal, then we know the extra weight is due to something else and we can start looking for it. I believe, however, that lots of mills make changes, from the beginning to the finish of the processes, which should not be made and would not be made if the superintendent was certain that the condition was brought about, as I believe it is, numbers of times, by an extraordinary amount of moisture or water.

The practical manager, superintendent and overseer will perceive the advantage gained along this line.

Another advantage is this—a good portion of our goods go into subsequent finishing processes, operated by our customers, and, as you know, goods shipped will sometimes be placed in a hot, dry warehouse by the customer before using, with the result that when he takes the goods out he finds they are "under-weight." By having the records on these tests we have proof of the actual water content in the goods as they left our mill, and have facts with which we can "talk back." We have had instances where investigation of a complaint of this kind showed the goods left our mill actually a few points on the heavy side instead of on the light side.

While we take record of the amount of weight gained when the cloth is subjected to standard conditions of humidity in the laboratory, this is of no paramount value except that it affords us a check on the relative humidity in our cloth room (where we have humidifiers, by the way) to let us know how close we have to standard conditions there. Our reports show that the cloth gains very little weight, comparatively, in the laboratory, which indicates that the humidity conditions in our cloth room are pretty close to standard.

CONTRIBUTOR No. 532.

Some Winding Troubles.

EDITOR COTTON:

I am operating Foster winders and am having some trouble with crossed ends on the first half inch of yarn from the cone shell. Also I am having some complaints of underwound cones. Will you please publish this in your department of "How Other Men Manage" with a request that some of the other fellows who are doing this kind of work advise me, if they can, as to how to overcome these difficulties? A little discussion on this subject may be of real value to a number of readers. B. B. P. (TENN.)

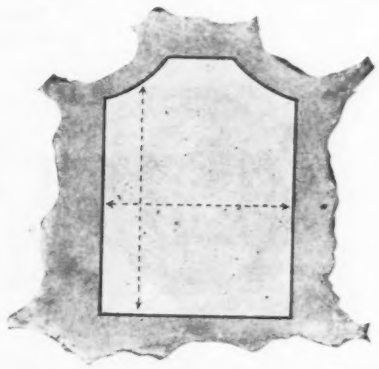
Finishing Netting.

EDITOR COTTON:

I would appreciate having you procure some information for me concerning the finishing of netting like the accompanying sample. What would be the most practical way to handle this material without distorting either the warp or the filling? Also what machines would be required to handle this class of work properly? D. Y. (WIS.)

EDITOR COTTON:

Replying to "D. Y. (Wis.)," he does not say either



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whether he wants the goods bleached or how stiff he wants them, and, therefore, the answer must be rather general.

The goods may be bleached at first by sewing together and then winding on rolls in about 1000 yard lengths. After being run on the rolls, they should be run at full width in diastafor at 3 degrees Tw., twice, at not over 110 degrees F., and let lie over night. Then run in soap and soda at 3 degrees twice, boiling, then rinse in cold water, then run twice at 2 degrees Tw. cold in hypochlorite of soda and Monopole soap, making certain the hypochlorite of soda is slightly alkaline, so that the addition of the Monopole soap (previously dissolved) will make no white sediment or scum. Run once in this and let lie two hours, then make the alkaline bath a little acid with tannic acid and run again and let lie one hour, then rinse in cold water, and it is bleached. Then have a three-bowled mangle and a 15 can vertical dryer and 40 to 60 feet of straight away tenter. After rinsing, run through hot water on the mangle, over the 15 vertical drying cylinders, where it is partially dried, and then over the straight away tenter where it is straightened in pattern, finished to width and dried, bleached.

In all cases it must be run on rolls, and run as straight as possible until it reaches the tenter. Then either the bleached or the unbleached goods may be taken to the mangle and starched, for example, with the following: 75 pounds of corn starch and two pounds of finishing paste (or cocoanut oil) with water enough to make 100 gallons when boiled. Boil this 15 or 20 minutes, run hot and squeeze rather heavily. Run this in range form, first starch then partially dry on vertical dryers, then finish to width, straighten the pattern and dry. This will give a medium stiff finish.

I forgot to say that the bleached goods must be blued in the starch. Almost all of these netting goods are bleached in England by being tied carefully in bundles and boiled and washed in hydro-extractors, etc. In this shape they do not go near any machine until their final starching and drying on the tenter. W. B. (MAINE)

Some Questions on Gassed Yarn.

EDITOR COTTON:

What effect does gassing a yarn have on break and size as compared with the same yarn previous to gassing? If possible show figures. Should the gassed yarn show any appreciable difference in weaving, and if so, why?

BERT (R. I.)

High and Low Card Flats.

EDITOR COTTON:

In reply to the article on "High and Low Card Flats," by "Bob (S. C.)," which appears in the June issue of COTTON, will say I want to tell "Bob" right off the bat that I do not like his idea of putting toilet paper under the emery at each end of the drum grinder to grind flats with. The roll drum is ground perfectly round by its master maker, and if it is not true after being run a while the shafts are not true, having been bent by some means or other. And to true the roller up again—well, that's a job for the master mechanic, and "Bob" probably knows where to look for him. If the roller is not true it is impossible to grind a

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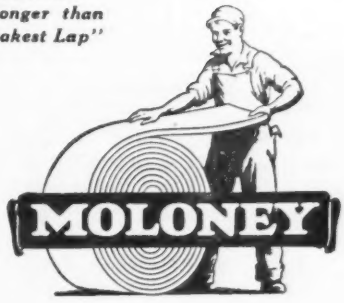

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flat true with it, and it is equally impossible to true it with toilet paper.

This is the way I keep my flats true: I re-cover my drum grinder with fresh emery every 120 days, pulling it on as tight as it can be pulled, making a smooth and true roller to start with. With a good sharp emery it is not necessary to grind so heavy to get a good sharp flat, as, if a flat is ground hard and heavy it will not grind true. For this reason, if the roller is set to grind heavy, the flat will sag in the middle, that is, if the flat is not strong enough to stand the pressure of the roller against it; if the roller is set heavy, the flat will "bow down" from it, leaving the flat high in the middle. That should be obvious because the ends of the flats do not have that flexibility and are ground off.

The next important thing I do is to have the band that is going to drive the roller taut enough so that there is no chance for any slip. For this reason, if the band does not slip, the roller will run or turn as many revolutions on one flat as another, and the flats will all be ground alike.

Let us suppose now that we have a set of flats here that have been ground several times with a slack band and we are going to grind them again, our band being slack, too. Without doubt there are a few "high flats" in the set, and when we set the roller down to the work, with everything running nicely and well enough to leave, along comes one of those high flats and stops the roller dead still. Then if we raise the roller up it will not grind any but the high flats, which are just a few, and if we let it down to grind the low flats it will not run when it strikes a high flat. By this it can be seen that in the place of the flats grinding true to one another they come to be more and more untrue. Also, it can be seen very easily that the roller stopped on the high flats without grinding them at all, while the low flats were ground as usual.

"Bob" is probably in a hurry, but I trust he will take time to read this. I thought I heard him say something about somebody's flats being high at each end. I do not know of whom he was speaking, but I know a fellow who uses the old emery until it is all knocked off, and in two or three grindings the flats are high on each end. One cannot always tell for certain whether it is the flat or the cylinder that is high on the ends by feeling between the flat and cylinder. The cylinder does not always grind true; for this reason, the clothing is slacker on each end, or each side, than anywhere else about the card. When the roller hits these slack places the wire "bows down" and is not ground off. This leaves the cylinder high on each side. If it grinds heavy the gauge should be tried between the cylinder and doffer to see if it is not tight on each side and loose in the middle.

There is another unevenly ground flat, which is ground "rocker shape," that is, the edges of the flat are ground off. These flats have a high streak right down the middle of them and are mostly found on Saco-Lowell and Saco-Pettee cards. The reason why these flats grind in this manner is because the shoes of the cradle become worn and they do not hold the flat in the right shape to be ground true. When the shoes become worn (that is the part of the cradle that the ends of the flats slide under), the thing to do is to buy a new cradle.

I see nothing wrong with "Bob's" settings; I like them, and the proper time to grind the flats is when the cylinder is ground; for one reason, it is done systematically and periodically.

G. W. H. (GA.)

Why the Ends Break at the Spinning.

EDITOR COTTON:

The question by "Y. S. (Ga.)" in the June number of COTTON regarding the ends on a spinning frame breaking after the bobbin was half filled or over, interested me, because I once had a problem that gave me a good deal of trouble. It was the reverse of that which "Y. S." is experiencing and I would suggest that he try just the opposite method from that which I followed.

In my case the frame ran fine until the middle of the set had been finished and then it started to balloon, increasing as the diameter of the bobbin increased. However, I followed, with satisfactory results, advice offered, namely, to increase the spindle speed and heavy up on the traveler. But "Y. S." should take just the opposite course, that is, running with a lower spindle speed and lighten up on the traveler. This is suggested only as an experiment, but worthy of a trial.

I shall be pleased to have "Y. S." tell the readers of this department what results he secures, and I trust that my suggestions may be of some help to him.

CHRISTY (MASS.)

EDITOR COTTON:

In answer to "Y. S. (Ga.)" in the June issue of COTTON as to what causes ends to break, would say, "Y. S." did not state what flange ring, what number or circle traveler, speed of spindles or twist per inch he is using. He should test his spindles with his speed indicator and see if they are running at the speed he desires, and also look over his gears and see if he is getting the correct turns per inch in his yarn.

Ends running at a smooth, regular tension when the frame is first started will sometimes balloon and lash down when the frame gets half full, or over, on account of the circumferential speed of the bobbin being much greater when half full than when first started, therefore, less tension is being put on the yarn by the traveler, causing more twist to be put in the yarn. A suitable traveler must be used to compensate for this.

On a warp frame with a 21/16-inch ring the frame should be started with as much tension as possible on the ends, as this will divide the two extremes in tension and will take care of the increase in twist as the frame fills up. As for the yarn looking fuzzy, that is due to the ends beating or lashing against one another, causing the short uneven fibers to break loose from the ends, giving the yarn a fuzzy appearance.

He should try different circle travelers and see if he can find a circle more suitable to the yarn he is making than the circle he is using at present. If he is using a No. 2 flange ring I would suggest that he try a No. 3 circle traveler, as I have tried a No. 2 and a No. 3 circle on practically the same number of yarn he is making, and the same predicament in which he is in and I find that the No. 3 circle gives the best satisfaction.

Separators should be used on warp frames for the diameter of ring and the number of yarn he is making. Spin-

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BOYCE Weavers KNOTTER

dles should be oiled twice a month or oftener, because the high speed of the spindles causes the oil to gum up and accumulate on the inside of the bolster and where the oil reservoir begins to get dry the spindles have a tendency to be retarded and run irregularly.

In changing numbers of yarn on my warp frames (which are equipped with separators) I have had pretty much the same trouble with the ends lashing against the separators and coming down. In most instances I have found relief by taking all inside bolsters out, one at a time, where the ends are lashing and washing them in kerosene oil, taking care to put each bolster back in the base case from which it came. Then, without removing the base case I flush it out with kerosene. Being sure that all kerosene has been wiped dry from bolster and base case. I replace the bolster and fill up with spindle oil and start my frame.

As this has been of so much help to me, I suggest that "Y. S." try it as his first remedy.

J. D. S. (N. C.)

Cotton Pocketing.

EDITOR COTTON:

I should appreciate some information through "How Other Men Manage" as to what would be the best way for obtaining a finish on pocketing, and what is the most common method employed for this class of work, also the machinery required to handle it. A sample of the goods in question is sent herewith. C. K. (WIS.)

EDITOR COTTON:

The sample of pocketing submitted by "C. K. (Wis.)," who asks in his question for the best way of obtaining the finish thereon, is of a very fine character, and it has evidently been singed on the face of the goods. This is at the option of the bleacher.

Pocketing and kindred goods may be either bleached or dyed, but in all cases they must be finished strong and must feel full and leathery. Tender goods will never do for pocketings or any sort of linings. On account of this I advocate the usual caustic bleach (one boil); i.e., steep over night in hot water (or diastafor at 110 degrees F.); boil for six hours in a two per cent mixture of caustic soda and soda ash, 60 to 40, wash and sour in hydrochloric acid; from this allow it to lie two to four hours in the acid sour, and then wash, chemic, sour and wash, mangle in hot water and dry up; or if hypochlorite of soda is used, no second souring is necessary. Doubtless there are much cheaper ways of doing the bleaching than this, but they are no good.

The following is an example of a first-class bleached pocketing made in England and finished there. In the first place, the goods, which were something like the sample which "C. K." sends, were 33 inches wide in the grey and the count was 76x60. The weight was 4.10 yards per pound, and the finished width was 30½ inches.

After bleaching, mangling and drying as stated, the cloth was allowed to cool. It was then conditioned on the damping frame or sprinkler and allowed to lie for at least two hours. It was then swiss calendered warm, on a five-bowled calender. This was to close up the threads and smooth up the cloth. The goods were then filled in an ordinary three-bowled compound lever starch mangle, using a ten-pound weight on each lever. The box must be large enough to allow the goods to go overhead in the liquor two to four times before entering the nip; and the coloring matter, which had better be some direct dyestuff, must be mixed with the starch, so that starching and dyeing (if the color is light) is carried out at the same time. The following is the starch mixture which must be mixed in the box and freshened up: White dextrin, 200 pounds; corn starch, 80 pounds; oleine oil (50 per cent), 7½ gallons; carbolic acid, ½ pint. Color to shade. Water sufficient to make, when boiled, 100 gallons, was added and the whole boiled together for fifteen minutes. The long boiling is important.

After starching the cloth was stretched on a clip tentering machine. It was then dried on the cans and allowed to cool off. Afterwards it was well conditioned on the sprinkler and allowed to lie for two hours. Then the cloth was swiss calendered, *cold*, on a five-bowled calender having cotton bowls only, and using a heavy pressure; after this it was again stretched to 30½ or 31 inches on a belt stretcher. This makes a very good-looking cloth with a dull, full, heavy, leathery finish. This finish is permanent and will not break up and feel bad in a week.

I will also give the method on an American pocketing, 33 inches wide in the grey. The counts are 66 x 56, and the weight 4.30 yards per pound; the finished width 30½ inches. These goods are bleached and mangled hot and starched *without* drying in a mixture of 130 pounds of corn starch and 100 gallons of water. Color to shade. Boil the foregoing and cool down to 120 degrees F., and add to this 4½ pounds of diastafor. When the starch is liquefied, add 60 pounds of China clay in 100 gallons of water. Boil all up together and add ten pounds of stearine soap previously dissolved. The stearine soap is made as follows: Stearine, 7 pounds; caustic soda at 36 degrees Baume, 2½ pounds; water, 7 pounds; boil together for one-half to two hours. This should give a white, compact soap. This starch is applied as stated, i.e., it is applied on an ordinary three-bowled starch mangle, dried, cooled off, conditioned, let lie for two hours, and calendered.

Then all, or nearly all, pocketing goods are doubled in the middle and put up in a bookfold with paper.

No very definite instructions can be given as to the weight or pressure that should be applied to the mangle or either the water or the starch as this depends on local conditions and the weight of the goods. It is enough to say that when bright finishes are wanted, China clay should be used, and for dull finishes, mineral should be used; and the lighter the pressure on the starch mangle the more filling will go in, etc. W. B. (MAINE)

Setting the Cushion Plate on Combers.

EDITOR COTTON:

In regard to the trouble "Joe (Mass.)" is having setting the cushion plates on his combers, I would advise that he try a different method of setting, namely, begin at the left of number 4; then the right of number 4; right of number 3; left of number 3; left of number 5; right of number 5; right of number 2; left of number 2, etc., taking a delivery on each side alternately.

Or, again, begin in the middle and work toward one

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end and then from the middle to the other end. This might help, because if one side of the plate is set, the other side being moved, upon looking at the first side again it will be found that it has changed, but not to the extent of 1/16 of an inch, as "Joe" states.

The foregoing method, I believe, is that used in many of the mills. H. D. (MASS.)

EDITOR COTTON:

The trouble that "Joe (Mass.)" is having setting his cushion plates is the same that has bothered me, and so far no method has been found which is entirely satisfactory in eliminating it. The ends of each adjacent cushion plate is fixed in a block and it is impossible to raise one without at the same time raising the opposite end of the next plate. The only way out of it is to set the middle of the cushion plate the proper distance from the detaching roll and let one end be a trifle high and the other a trifle low. This is contrary to all accepted theories of combing in that the cushion plate is not absolutely parallel to the detaching roll, but as the nipper knife and cushion plate must be parallel with each other, the setting has to be sacrificed. The exact angle cannot be obtained either, as the cushion plate setting will be disturbed, so the heads must be set as near as possible.

These statements apply only to the particular make of comber under discussion, and on other combers, the cushion plate should be set absolutely parallel to the detaching roll, and the angles all set the same.

CONTRIBUTOR NO. 3621.

Setting by Gauge.

EDITOR COTTON:

I note in the March issue of COTTON that "A. L. (N. C.)" cannot agree with what I have to say in regard to a loose or tight gauge, and I wish to state here in the beginning of this letter that I knew when writing upon the loose and tight gauge question that all would not agree with me, neither did I expect them to do so. However, I want to say to "A. L." that he cannot use a tight or a loose gauge and still be setting his cards.

I do not mean to say that when we set to a number 7 gauge or a number 9 gauge that it should require a good bit of strength to pull the gauge through, neither do I believe in setting so there will be no friction felt upon the gauge at all.

This is my idea of setting. If I am setting to a number 9 gauge I set to a number 9; that is, I set level from one side to the other with enough friction upon the gauge so as to have it feel as if it were being pulled through some sort of a syrup, that is, a slight pull from one side to the other and feel the same all the way across, not so loose that you can scarcely feel any resistance at all, and at the same time not so tight that you can hardly pull it across.

Now, as I said in my first letter, there is no such thing as setting to a tight or a loose gauge, as some men would have us believe, but we are either setting to a gauge or we are not setting to a gauge. As A. L. says, you cannot set old cards like you can set new ones. That is all right. Get a gauge they can stand and not say a loose gauge. If we

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can set new cards to a number 7 and do not think our old cards can stand that setting, then get a number 9 for the old ones and not a loose 7. There is no argument to it. We are either setting to the gauge or we are not setting to it by this so-called loose and tight gauge. As I said before, we have the gauges to go by and let's use them.

Any man who is a carder or a grinder can tell what gauge his card can be set to, and the thing that counts is a good level setting, no matter what gauge we are setting to.

BAB (N. C.)

Traveler Circles and Other Spinning Questions.

EDITOR COTTON:

May I at this time enumerate a few points relative to the question of "J. W. (Ga.)" as submitted in the March issue of COTTON on the subject of "How Small a Circle Traveler Can Be Used?" I also wish to bring up some subjects that could probably be discussed by some of COTTON'S readers with profit to all, and will simply suggest a few such questions that are worth considering to see if there cannot be a few replies advanced.

In reference to "J. W.'s" question, I quite agree with him that one should use a traveler with as small a circle as possible, having a tendency then to get certain slugs, bunches, etc., that would otherwise go through at the spinning. If "J. W." is in a mill where his range of numbers is fixed within practically definite limits it will be possible for him to get as small a circle traveler as he may deem advisable for his purpose and "break in" onto his ring. When he has the proper weight and proper circle his traveler, as I believe is the case, should seem to "float" on his flange.

Now, the smallness of the circle used may also depend on yarn size, for as the traveler is reduced in circle it reduces the limit in weight that the traveler manufacturers can make, and so if we have a small circle traveler down to say a certain weight traveler and we put on a yarn that demands a heavier traveler which we cannot obtain in that circle we are obliged to go back to a little larger circle so as to get the heavier traveler. I also believe that as the traveler is reduced in circle its tendency is to have less "give" to it when putting on a new traveler.

Now I trust some of COTTON'S other readers will discuss this question on traveler circle and enumerate a few yarns they may be running, giving their speeds, size and flange of ring, style and circle of traveler and see how they compare.

Here are a few other points that I also wish COTTON'S readers would discuss:

1. Types of ring, single or double flange, width of flange, that is No. 1 or No. 2, advantages and disadvantages and estimated service life.

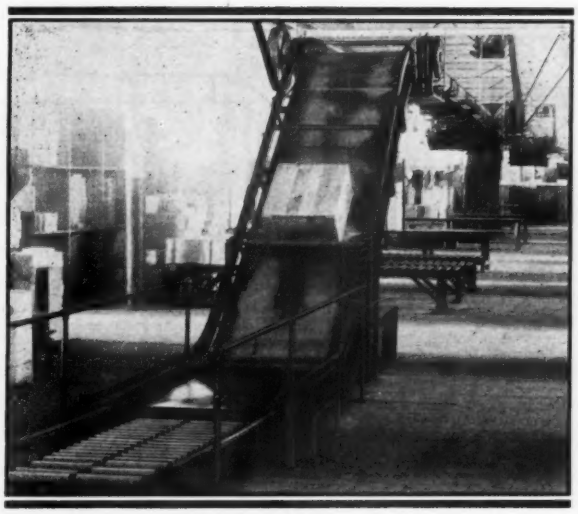
2. Ring holders—plate or cast iron. Which is preferred and why?

3. What policy is adopted on ring replacement for worn or cracked rings?

4. What are the advantages or disadvantages of burnishing rings? Why should this be done and what effect does it seem to have on the rings?

5. What is the opinion as to turning rings over?

6. How often should travelers be changed—on coarse counts 10s to 40s, on medium counts 40s to 70s, and on



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the finer counts 70s to 100s. What system adopted and why?

7. What system of spindle setting is employed in the spinning room? Who is responsible? Are frames set in rotation or here and there? How long will a frame run before needing setting?

8. Which is preferable, the round or square pointed traveler? Why? What has been the experience of the reader with both on breaking in a new ring and on changing over an old ring?

9. In the May issue of COTTON "J. A. H. (Conn.)" refers to the flat top traveler versus the round top traveler. What is the experience of others on this?

10. What are the probable causes of "wavy" rings?

11. Is as light or as heavy a traveler as possible run, and why?

12. What system of roll weighting is used in the spinning and what type is preferred? About how much weighting as to pounds is necessary?

13. What is the opinion as to the three top front lines of rolls weighted as against the back and top rolls weighted, the middle roll being self weighted, or as against the front weighted. The middle and back being self weighted?

14. What break draft is advisable with all top rolls weighted or with only the front and back top rolls weighted and with only the front top roll weighted?

15. What roll settings should be used under conditions where the three top lines are weighted, where the front and top lines are weighted, where the front top roll only is weighted?

16. What system of scouring frames is employed in the spinning room, when done, and how often is it necessary to scour a frame on coarse, medium and fine counts?

17. What humidity should be maintained in a spinning room. Actual grains? Relative per cent? At what temperature? When the room heats up to 90 to 105 degrees F.? What are the results at high temperature on size and break? What difference does this heating up have in different yarns of coarse and fine counts? What humidity should be maintained for coarse counts and what for fine counts?

18. What system of oiling is adopted? How often will spindles need oiling?

19. How long should bolsters last with proper care?

20. Advantages and disadvantages of tape versus band drive as to uneven twist, etc.? How does the weather affect a tape drive?

Now if such points as these could be created into some form of a questionnaire and grouped with other questions relative to spinning, it seems to me as though COTTON could receive some definite replies and devote a certain section under "How Other Men Manage" to a *heading* "Spinning Querie" or some other suitable title until this questionnaire enlarged from others could be printed with answers at so many question per month.

In any case, I am sure there are a few thoughts advanced in the foregoing that will bring out points of interest for many. BERT (R. I.)

Time is the one thing that can never be retrieved. One may lose and regain a friend; one many lose and regain money; opportunity once spurned may come again; but the hours that are lost in idleness can never be brought back to be used in gainful pursuits.

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Help the Other Fellow Along.

EDITOR COTTON:

Jurging from some of the correspondence in COTTON lately, we have a few cloth room men, boss weavers, and master mechanics who ought to be—well, I'll not say hanged, but who ought to have their tobacco taken away from them. These letters have doubtless put some men to thinking. But do they all think aright? No, some of them think just like they do when they read what "Old Timer" says about *them*, and say, "Gosh, didn't he step on So-and-so (meaning the *other fellow*)."

Now all such cooperation (?) as this is no doubt one reason why it is necessary to curtail production sometimes and cut expenses. These fellows who have been stepped on are beginning to wake up and howl, but they haven't got their eyes open yet. Some of them don't know yet just what did disturb their peaceful slumber. Possibly it was a hideous nightmare about what these other fellows were trying to do to them and they kicked the cover off, but they are not awake enough yet to get the nightmare off their minds. Of course some of these fellows have been on their jobs so long that they know just how perfect (?) they are, and can tell you exactly where to put your finger on the trouble anywhere in the mill. They can tell you what the other fellow does to hold up production, and what they could do if the other fellow would do—and say, did you ever hear that other fellow's story? Well, it doesn't matter, because it's the same story—so there you are.

We were talking about these letters in a little gathering the other day, and I had expressed the foregoing thoughts. It happened that we had just finished our regular overseers' meeting, and were hanging around the superintendent's office before going back to the mill. Our "super" is a pretty wise old bird, and occasionally gets very philosophical, and after listening to us talk about this sort of mill men for a while, he chirped in, saying:

"They ought to have their legs tied together and be made to run until they learn to help each other. These same fellows will tell you they absolutely wouldn't have a superintendent's job, and they don't know that you and I and everybody else knows that they are not going to be offered one. These fellows are just common every-day 'road-hogs.' That's all. They won't pull over an inch to let somebody pass. They're simply holding up the traffic, that is, progress. I am a believer in progressiveness. If you can't run, step over to one side and let somebody by who can run. Maybe he'll get there then and come back after you. You know, when you help a fellow along a little, he doesn't forget it, if he is any man at all; and if you knock and kick him, well, he doesn't forget that either. So the best way in the world to get somewhere is to take someone with you. When you fight it all alone you are up against it—and that's just why you have been holding down that same old job so long that you are sour on it and everybody around it. You know, even the flies will stay away from a jug of vinegar if it is uncorked. If you just can't keep from being sour, please keep corked up, and then maybe you can get close enough to the other fellow to find out that he is not so bad after all. And then some fine morning, when everything is going good, walk up to one of these fellows and stick out your hand and say, 'Jim, old boy, put 'er there. It's just beginning to dawn upon me where I'm at.

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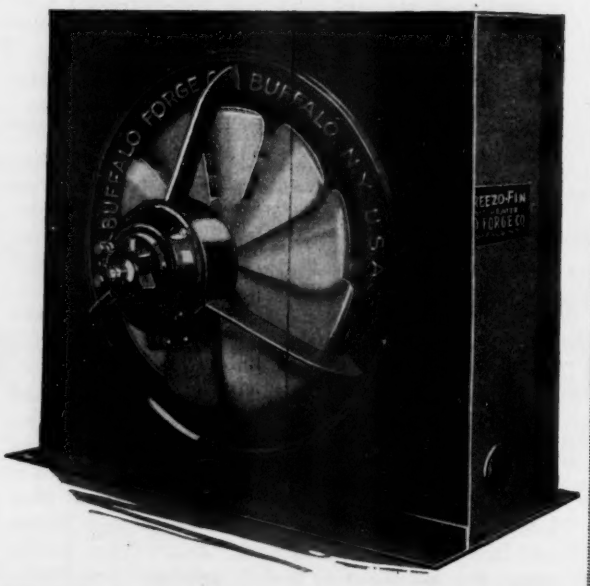

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"Then continue the good work, and be glad to meet each other, and quit going around some other way to keep from meeting. Too many men think, 'Well, I'm running my job. I'm getting by. Darn the other fellow. Let him run his.' Yes, that fellow is getting along all right, possibly, but the first thing he knows he'll hit a rough place and have a puncture—and you know, not many people stop now-a-days to help a man change tires. If he hadn't been watching the other fellow behind him he might have seen the rough place in time to avoid it. But as it is, he is to blame himself, and everybody in sight knows it.

"Speaking now of alibis, of course that is absolutely natural. You know when the Lord spoke to Adam about eating the forbidden fruit, Adam tried to lay it off onto the woman for giving it to him. But that didn't help Adam a bit. Just the same, men have been laying the blame on the other fellow ever since. Sometimes, of course, alibis are accepted all right, but quite often they're not. Show me a man who always has an alibi handy, and I'll guarantee you he's not on one of the better jobs. If you pull a boner, by golly, come clean with it, and you'll be respected.

"You fellows are talking about the different jobs in the mill. As I see it, from the master mechanic to the cloth room, every department is essential, and I see no reason for jumping onto a man because he is fortunate enough to be head of one of these departments. If he pops off and gets in wrong he'll be glad to get right if you'll show him where he is wrong. But you can't show him by snapping back at him.

"I think if more men would only apply 'Old-Timer's' articles where he intends them, we would get along lots better. And, say, wasn't that article in the May issue of COTTON, on 'By-Products' right to the point? I wonder how many of those by-products we let go, and see others let go to waste. Just because we are getting by we will not sacrifice enough time to utilize a by-product that means waste to us and not the company if we let it go.

"Let's all get to work on our by-products and stay so busy that we won't have time to look back at the other fellow and let him run us onto the rocks."

JACK (TEXAS)

Causes for Uneven Yarn.

EDITOR COTTON:

It has been some time since I saw anything in "How Other Men Manage" concerning uneven yarn, the greatest evil in cotton manufacturing today, and if you and the readers of COTTON will bear with me for a few lines I will try to the best of my ability to mention a few things on this subject.

We all know that the first thing to do is to get an even mixing; yet I would not try to write a letter on this subject without first explaining just what is meant by a good mixing. It is the mixing of the different qualities of cotton in order to secure an economical production of uniform quality and color and also an even yarn.

All mills should be equipped with a bale breaker so that the cotton can be opened as it should be opened, and not thrown off the bales in flakes and bunches of 15, 25 or 40 pounds and expect the automatic feeders to perform the work as well as the other machines. No matter how small the opening room, mix as many bales at a time as possible; if not but five bales, see that they are thoroughly mixed; if fifty or seventy-five, so much the better, as it will be the means of eliminating some of the unevenness in the yarn.

Our mixing and picking rooms have been slighted, but I am glad to see that they are now being recognized as the foundation of successful manufacturing.

Evenness and regularity in the laps is of the most importance for producing a perfectly even yarn. Strict attention should be given to the feeding of the cotton to the breakers and the correct weighing of the laps on all these machines, for if the feeding is regular and the laps are correctly weighed, it must produce even work on the cards, provided all things are in good order about the cards.

It is also necessary that the lappers should be kept as clean as possible, and well and carefully oiled. The axles of the beaters must be free from rolls else it will cause the cotton to run to one side and make heavy-sided laps. Imperfect air currents will cause irregular and uneven laps, and this of course will cause uneven work throughout the mill.

Carding is the most important process in the entire system of cotton manufacturing, and is the backbone of good spinning and of perfect yarn. Tre theory that uneven picking and carding will regulate at the combers and drawing and through the other processes should be banished from the mind. The sooner we realize the importance of the proper mixing, picking and carding of cotton, the sooner we will be up with the best cotton spinners in the world.

Uneven yarn is caused by improper setting, licker-in in bad condition, clothing in poor condition and not properly ground, too much draft, work too heavy, machines not cleaned and oiled properly, improper stripping of cards, clothing not suited for the numbers being spun (some men think they can successfully spin 80s with the same number of wire that they use on 20s.)

On the drawing, unevenness will result from the bosses of the leather rolls, whether solid or shell, not being the same in diameter, poorly varnished rolls, metallic rolls not properly cleaned, rolls not correctly weighted and oiled, top and bottom clearers not kept clean, top and bottom rolls not kept clean, change gears not properly set and gearing in general not in good condition, and some allowed to slip, rolls not properly adjusted, too much draft between the back and third rolls, worn necks, bent rolls, flutes worn out, stop motion not working, poor piecing, calender rolls not properly set, trumpets made so that the sliver is not condensed as it should be, frames run at to high a speed—and the worst of all is the electric stop motion if it doesn't work.

On the slubbers, intermediates, speeders and jack frames, poor piecing at slubbers and roving frames will make uneven yarn, as will long piecings made when setting in the full creel, hard ends, the gathering of waste around the top and bottom of the skewers, causing them to bind in the creels, skewers in bad condition generally, broken creel steps, top and bottom clearers not kept clean-

F. A. BUESCHER

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As a pioneer of the band instrument business in America and a life long advocate of community music may I presume to congratulate you on your marvelous accomplishments in settlement work. You have done a wonderful job, actually as well as in proving by practical demonstration, that what we have always wanted to believe, is really true.

Pride, perhaps, in my own work, prompts me to assume that your bands and orchestras have done much to foster and promote the peace and harmony of your colonies. Naturally I am overjoyed that Buescher True-Tone Instruments are so well represented among you. We have received many wonderful letters and some most interesting pictures from your musical directors and their men. Can we be of some assistance to you in this work? Is our stored up knowledge, over fifty years experience, organizing bands and keeping musical activities in motion, worth anything to you? We invite correspondence. We have literature (furnished gratis) that you might want to distribute. Tell us your problems and we will try to help you find the solution.

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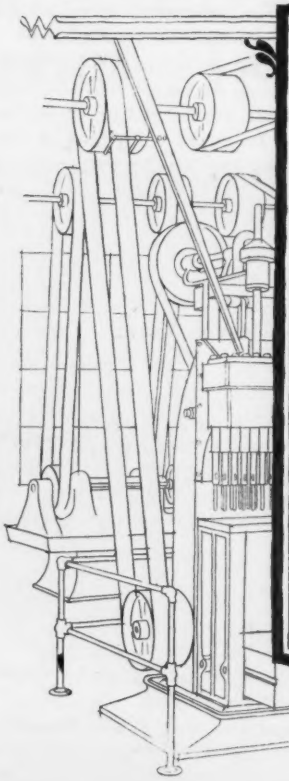

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Recommended for quick action, as it may be applied without stopping the machinery. It may be safely used on leather, rubber or fabric belts without clogging, hardening or cracking the belt, even after years of use. If applied sparingly at intervals it will preserve the belt and prevent loss of power through slipping.

To apply, simply tear away a small portion of the paper cover to expose one end of stick. Hold this against the pulley side of the moving belt; use only a little at a time.

Write for Sample 34-O.

JOSEPH DIXON CRUCIBLE CO.

Jersey City, N. J.

Established 1827

ed, poorly covered and bad fitting rolls, steel rolls not kept clean, flutes worn out, rolls put in with the laps running the wrong way, loose fitting joints, worn necks, bent rollers, too much draft between the back and middle rolls, too much draft throughout the entire machine, tension too tight, allowing the frame hands to take up on the tension instead of changing the tension gear, pressers not wrapped correctly, improper winding of roving being made where a radical change is made by not changing the bottom cone gear and builder gear, change gear not properly set, spindle and bobbin gears set too deeply, badly balanced and badly fitting bobbins, flyers not kept clean and balanced, machines not kept clean and well oiled, fanning off machines at any time, roving guides becoming partially filled with waste, running top rolls with grooves in them.

When the yarn gets to the spinning, defects already made cannot be remedied, but it is possible to make uneven yarn here. Among the things to be looked after and eliminated are: lint allowed to accumulate on top of the creels, waste allowed to gather around the top and bottom of the skewers and skewers in bad condition, broken creel steps, long piecings when setting in the full roving, skewers set down onto creel board creating more friction on the roving, roving guide rods not properly adjusted so as to travel the proper distance, roving guides partially filled with waste and in bad condition, allowing the spinners to fan off their frames at any time, rollers not properly covered, the bosses of the leather covered rolls, whether solid or shell, not being the same in diameter, rolls put in with laps running the wrong way, rolls not properly cleaned and oiled, rolls with grooves, saddles not correctly placed on the rolls, loose fitting joints in the steel rolls, stirrups rubbing against steel rolls, clearers not kept clean, lint allowed to accumulate on separators where they are used, bobbins not balanced, travelers too heavy, worn travelers, spindles out of center of ring, guide wires worn and not properly set, etc.

These are not all the causes of uneven yarn, but are some of the things that we may easily overlook without knowing it. BAB (N. C.)

Some Further Fly Frame Discussion.

EDITOR COTTON:

In the September issue "T. A. A. (S. C.)" answers my June letter on the lay gear, etc. It will be remembered that in a previous letter, "T. A. A." suggested that we change the lay gear instead of the rack to remedy the tension on fly frames.

In his rebuttal in September, "T. A. A." states, "I will say that on all modern fly frames there is a bolt that holds the cone belt guide on the rack bar, and by loosening the nut the guide can be moved until the proper starting tension is obtained. I wish to call 'Wash's' especial attention to this fact: Changing the lay gear will not prevent any adjustment of the cone belt guide." Continuing, he states he would like to have me answer why it is impossible to secure the proper starting tension after changing the lay gear as after changing the ratchet or rack gear.

As I understand him, "T. A. A." would change the lay gear, and then loosen the belt guide to give a proper tension. But what about the proper starting point when the speeder is doffed? We all know that the belt guide is set

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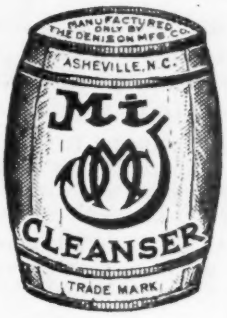
MI CLEANSER



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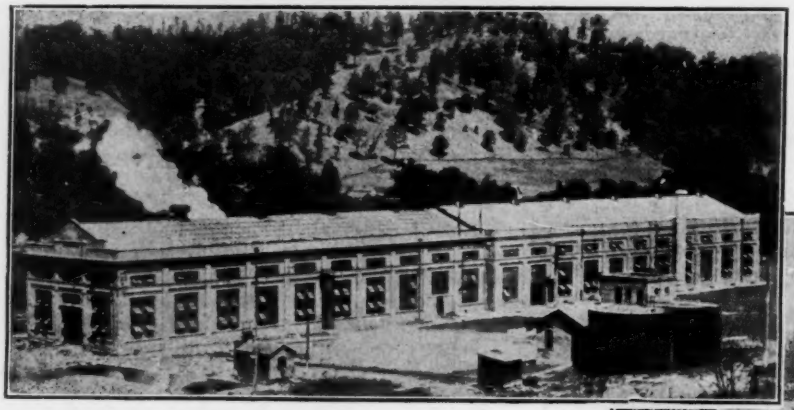

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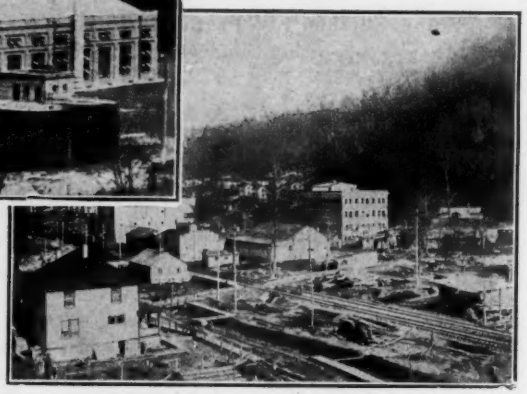

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at a point to suit the diameter of the bobbin at the beginning of the set and should not be disturbed. I want to say if any carder under my charge followed the above practice, I would discharge him on the spot.

I have already answered "T. A. A." on humidity.

At the end of his letter, "T. A. A." says, "'Wash's' stretched roving is all his fault, and not the fault of the bobbin-lead frame builders."

Granted that I am at fault about stretched roving, I can boast that I have charge of a mill in this state that has the highest reputation in the world for its product, and is working day and night in these dull times. I hope "T. A. A." will give me the credit of not dodging any question put to me. I have answered his question, and now would like to have him answer the following:

On all fly frames the figured draft is never obtained. This is due to frictional contact. Frictional contact shortens the strand. "T. A. A." and others cannot deny that light work is found in every cotton mill. Now, remember, frictional contact is like the law of compensation; it is never still, it is always at work. Now, if the strand is shortened and at the same time is found to be light, what is the cause? When the room is hung to spin a 30s yarn, and the sizings show up 32s, 31.50s, 29s and 28s, what is the cause?

Please remember that "T. A. A." is defending the bobbin-lead fly frame. Wash (R. I.)

The American Bemberg Corporation has employed Lockwood, Greene & Co., engineers, with New York, Boston and Atlanta offices, to prepare plans and to supervise the construction of its new American plant. The officers of the company are as follows: Arthur Mothwurf, president and treasurer; Jacob Strauss, vice-president and secretary; Myron S. Falk, second vice-president; Max Korff, technical manager. The address of the company is 65 Madison Avenue, New York City.

After a thorough investigation of various sites the company has purchased 172 acres of land located between Johnson City, Tenn., and Elizabethton, Tenn., adjoining the line of the East Tennessee and Western North Carolina Railroad and also bordering on the Watauga River. It is announced that the new plant will provide employment for 1,500 to 2,000 people and will embody the very latest and most modern practice in its construction and equipment. The company will produce Bemberg Tram according to the Bemberg process. It is understood that production at the start will be at the rate of 6,000 pounds of yarn per day. Buildings will be of reinforced concrete and steel with an approximate floor space of 400,000 square feet and the estimated cost of the buildings without equipment will be in the vicinity of $1,500,000. Lockwood, Greene & Co., engineers, are assisted in the prepaartion of plans by Mr. Korff, who will be in charge of manufacturing operations at the plant after its completion and by Myron S. Falk, consulting engineer, of New York City. It is estimated that a period of about two months will be required before the engineers will be ready to receive bids on various items of construction and equipment. It is further announced that the plant will be equipped entirely with new machinery at an estimated cost of one million dollars, additional. The financing for the new plant has recently been arranged and includes the issuing of $3,500,000 7 per cent preferred stock.

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If you knew, you'd have one...

Striking Production Increase

Here is a case. Production is boosted on bleachers and driers in one mill by running thin cloths through faster than thicker ones, instead of running the machines at a constant speed for all cloths—a speed fixed primarily for the thick cloths.

Better work, 80% less breakage

Another case. Most breakage of silk fibers in the throwing frames occurs at the start and stop. 80 per cent of this was cut out at one mill by a variable speed transmission which starts the machine at 1/10 operating speed and stops it the same way.

• • • •

The machines equipped with Lewellens always turn out better work and more of it. The Lewellen is sturdy, often goes for years without attention. There should be a Lewellen on your tenter frames, dryers, moisteners, washers, mangles, starching and printing machines, singers, mercerizers, silk throwers and winders.

Do you want to talk with a thoroughly trained man who can probably point out worth-while savings for you? Then just write!

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1. Every bearing a ball bearing.
2. Accurate and minute adjustment — locks in place at desired setting.
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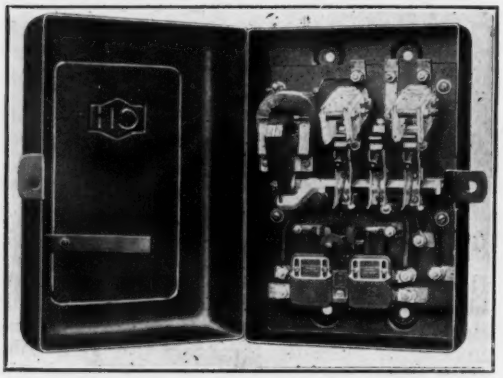
4. Stronger discs.
5. Specially designed durable belt.
6. Adaptable for floor, wall or ceiling mounting.
7. May be equipped with hand, remote, or automatic control.

LEWELLEN
Variable Speed
TRANSMISSION

A New Across-the-Line Starter.

The first two of a new line of automatic starters for squirrel-cage and single-phase motors have been developed and placed on the market by The Cutler-Hammer Mfg. Co., Milwaukee.

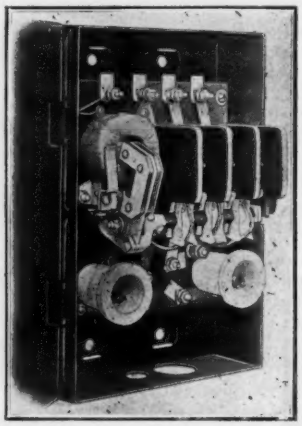
Both of the new "X" starters have a three-pole switching mechanism, with butt contacts of an improved design that insures long service and permits easy renewal of the



Bulletin 9586 starter showing switch mechanism and thermal overload relay.

contacts. The switching mechanism, terminals and overload devices are mounted on a slate panel which is enclosed in a steel cabinet provided with knockouts for conduit wiring, and the entire construction is exceptionally compact, the cabinets being only 13½ inches high by 9 inches wide by 6 inches deep. The cabinets are arranged for convenient mounting on wall, post or machine.

One type of these new starters, the Bulletin 9585 type, is equipped with thermal overload cutouts to provide protection against overload, but which carry the starting current for a sufficient period to permit starting of the motor and to take care of temporary overloads. This starter is

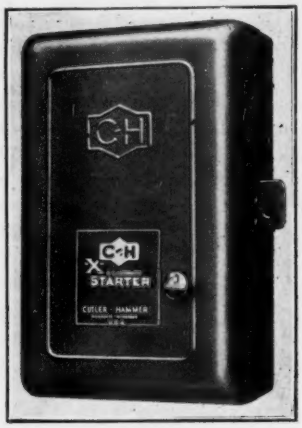


Bulletin 9585 starter with cover of cabinet opened to show switch mechanism and thermal cutouts.

for use with single-phase and standard poly-phase squirrel-cage motors of maximum rating of 7½ and 10 hp. for internal start squirrel-cage motors, 440-550 volts.

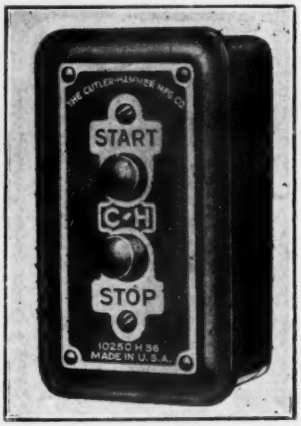
The Bulletin 9586 starter is equipped with thermal overload relay of a new design that is claimed to be the most accurate and sensitive ever developed for an automatic starter of the across-the-line type. It does not trip on momentary overloads, but quickly responds to maintained overloads, or short circuits, giving complete protection to the motor. The relay is reset after tripping by pressing a reset button which projects through the cover or automatic resetting can be obtained as an optional feature. This starter has a maximum rating of 15 hp., 440-550 volts for single-phase and standard squirrel-cage motors; and 30 hp. for squirrel-cage motors with internal starters.

Both the Bulletin 9585 and Bulletin 9586 starters can be operated by means of pushbutton master stations such as the one shown by the accompanying illustration, or they can be used in connection with float switches, pressure-



Exterior of cabinet of starter 9586.

actuated switches and similar single pole switching devices. Starters with three-wire pushbutton control provide low-voltage protection because the operating coil is de-energized when the line voltage decreases materially, and it is necessary to operate the pushbutton in order to start the motor again. Starters with two-wire float switch con-



Push-button master station for starter control.

trol provide low-voltage release because the operating coil is sufficiently de-energized, when the line voltage decreases materially to cause the contactors to disconnect the motor, and when the voltage is restored the coil is energized and the motor connected to the line if the float or other control switch has remained closed or is closed again.

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again in popular demand

New Model K

$3\frac{1}{2}$"—300 Needle—70 gauge

Heel Reduced in size

HIGH spliced heel and double sole reduced in proportion, making a narrow stocking over the instep and foot. The machine embodies all the regular features of the Model K including fashion seam and fashion marks.

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We Spin Cotton Yarns in All Numbers from 1's to 100's.

We Twist these yarns in Any Number of Plys desired from 2 ply up.

We Furnish these single or twisted yarns to suit your own particular purpose. Any Twist you say.

We furnish them on Cones, Tubes, Spools, Bobbins, Warps, Beams, Skeins—Gassed or Ungassed.

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and behind all this an Organization that has been Spinning Yarns for Years and Years.

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SPUN FROM

EARLY BLOOM COTTON

QUISSETT MILL

NEW BEDFORD, MASSACHUSETTS

80,000 SPINDLES

QUISSETT MEANS QUALITY

Aspects of British Knitting Progress

BY WILLIAM DAVIS, M.A.

Needles.

During the war the key importance of the humble hosiery needle was forcibly brought home to the authorities when it was found that the foreigner in enemy countries practically held the monopoly of this branch of accessory production, and within a few months the equipment of knitting manufacturers everywhere was slowly being put out of commission as the existing stocks of needles became exhausted. At this juncture the needle maker came to the rescue of the country and concentrated on the great difficulties inherent in tackling a new industry without machinery and plant for high production. It is too little recognized how the high quality of fabric, especially in the finer gauges, depends on successful needle production, and particular skill in micro-measurement. With the increasing fineness of knitted texture, the continued progress of the excellence of the fabric is intimately connected with the success of the needle manufacturer in specializing in micro-measurement and absolute accuracy and regularity of results.

Artificial Silk.

The looming large of artificial silk on the textile horizon has brought new difficulties and problems into the wake of the maker of knitted fabrics and recent exhibitions are particularly valuable as affording unique opportunities for manufacturers to see the new devices which have been brought out to meet the peculiar difficulties inherent in this very valuable material. One of the most serious obstacles to successful manufacture is that of winding and with few exceptions the existing winding plant has been found quite unequal to the peculiar problems of successful winding of this material.

Several makes of winding machines are now shown where the movements have been greatly refined to correspond with the nature of the new material, the direct method of hank winding, the two-process system and so on all claim attention of the experts. These new systems make it possible to wind the material with a minimum of knots and waste, which formerly played havoc with the profits of manufacturing this fiber.

Bobbins.

For wool and cotton yarns of coarse or medium counts, ordinary types of yarn packages may be quite suitable, but recent displays demonstrate that there is a science in the manufacture of bobbins. Much research has been expended in getting the correct balance of the bobbin to obtain the most even results in working and it has been found that a wobbly bobbin which sways during the winding operation produces irregularities in yarn tension which react very unfavorably in the subsequent finishing operations. Crass irregularities in the finished article are often caused by heavy and light tensions, the tight portions allowing a more reluctant penetration of dye than the looser portions. The matter of ballooning of the thread as it issues from the bobbin should also be studied in a more exhaustive manner than has been done in the past.

Knitting Machinery.

The exhibits in knitting machinery afford the most intense interest on the part of manufacturers as the inventor has been peculiarly active during the past two years in this respect. When advances of real merit are made in the machine mechanism, it generally happens that the branch of the industry depending on it also makes a great leap forward. The new fabric rendered possible creates its own market, and this quest for novelty and the production of fabrics to satisfy this demand are the life blood of the industry today. The stagnant ideas of bread and cheese production are no longer of any value and the manufacturer has to stimulate his creative faculties in a thousand ways. It is notable that a number of the circular machines reveal a greatly augmented figuring capacity of design.

Formerly the knitting machine was content to produce the small square and neat bird's eye effect, but the enlarged pattern wheels and improved designing scope thereby opened up to the designer has made possible the wide range of larger effects which have been so popular in recent fabrics in great demand for clothing. Of special interest is the knitting machine where the Jacquard principle of pattern production has been successfully adapted to the circular machine. In this case there is no limit to the capacity of the design as a pattern can extend right 'round the circle of the machine for its repeat if desired. These machines also show a greatly improved fabric texture, the stop motions have been rendered more reliable and the fabric produced has been vastly improved in regularity of mesh.

British makers have lately been making strenuous efforts to take their due share of the fine gauge fabric trade and this increase of fineness of the latch needle machine has been fraught with many difficulties. However, it is satisfactory to note that the latch needle is being improved so as to be adapted for greater fineness of fabric, along with an increase in its non-laddering property. One type of machine makes a special feature of super-production, one yard per minute, which is unrivalled by any other textile machine for sheer production of fabric.

The automatic machines have also shown great advances in patterning capacity, and have played an important part in the development of the vertical striped and check products which still figure so largely in textile demand in footwear, a demand which shows no signs of diminishing. The examples produced on fine gauge machines of dress fabrics such as crepe-de-chine and fine surfaced dress goods usually associated with the products of the looms are shown in interesting profusion.

In the stocking section, the much discussed stocking in artificial silk in finest mesh figured largely and its system of manufacture is amply demonstrated. The machine with its 300 needles in a cylinder of 3¼ inches in diameter is now a practical proposition.

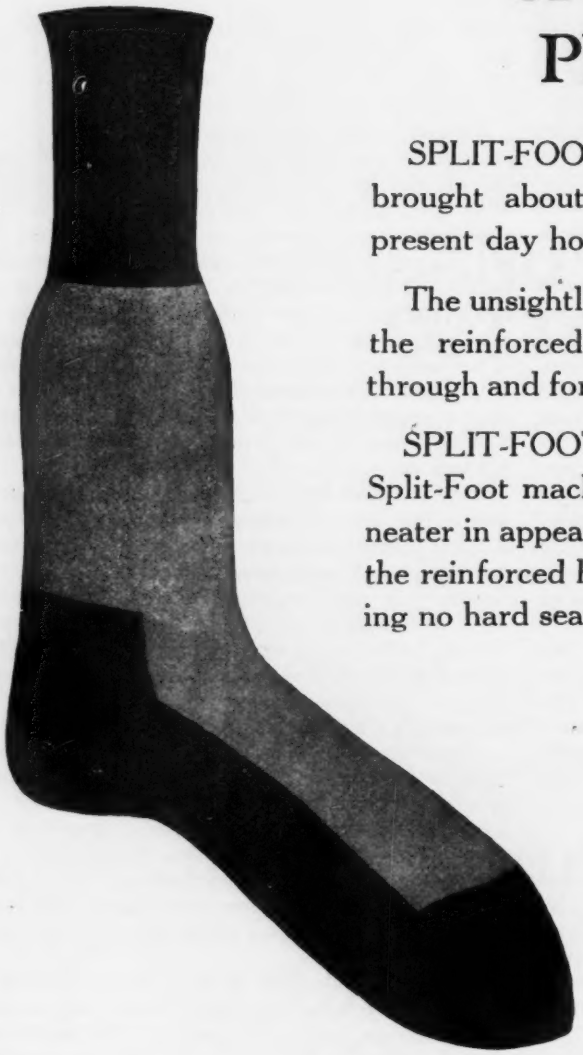
It is well known that the knitting industry has also entered other branches of textile requirements, notably the millinery textile, bandages, and the tapes and bands for ornamental trimming. Gloves, costumes and all kinds of knitted dresses from the famous flat knitting machines are also to the fore.

Sewing, Seaming and Embroidery Machinery.

The sewing machine and its auxiliaries have leaped into prominence in recent seasons on account of the various ramifications of the machine in the direction of embellish-

The "BANNER"

SPLIT-FOOT PRODUCT



SPLIT-FOOT HOSIERY, the new creation, brought about by the main disadvantage in present day hosiery, namely:

The unsightly inside fringe of splicing ends in the reinforced portion which tends to slip through and form whiskers on the outside.

SPLIT-FOOT hosiery made on "BANNER" Split-Foot machines is smoother on the inside, neater in appearance and has added strength at the reinforced high splice and double sole, having no hard seams.

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ing the knitted fabric. Very complicated mechanisms are necessary to produce certain kinds of patterning on the loom and very close imitations are obtainable on the sewing machine attachment just at the point desired. These fabrics have been largely employed by the custumier during recent seasons, and there are several new types, all worked on knitted fabric.

Finishing, Mercerizing, Etc.

It is fitting that the final stages of the knitted fabric should be well represented at the exhibitions and various new types of hosiery presses are on view which demonstrate improved methods of finishing. Careful study in some of those devices has been given to the question of giving a better and loftier handle to the goods and after heating the fabric to a high temperature in pressing, it is desirable that it should be cooled off again before being delivered. Some very efficient methods of doing this have been devised in the newer machines.

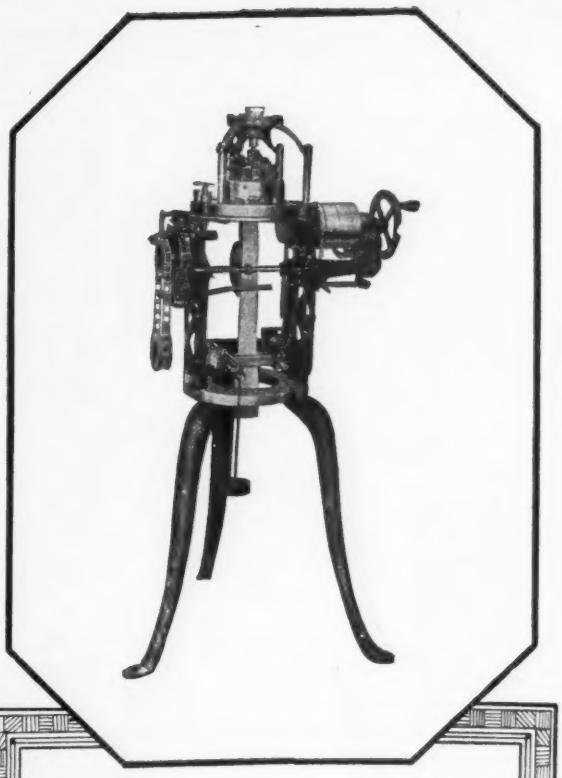
Close scrutiny of each machine shows that in many ways the comfort of the worker is being more and more studied in regard to machine construction. The accessories which have been devised all contribute their quota to this end and indirectly serve the purpose of increasing production and increasing efficiency. When workers are set to operate the modern high speed sewing machines it is of importance that they should be placed in the correct position at the machine so that the eye is at the right angle to observe the progress of the work. In this way it is advisable to devise stools or chairs which can be adjusted according to the stature of the worker. The ordinary chair tends to make the worker too comfortable and induces somnolence, but it is possible to devise supports on stools which grip the small of the back and the powers of endurance of the workers can be safeguarded. This affords support without encumbering the free action of the arms.

The handling of articles during work often means that large heaps of material accumulate in front and boxes have been added to the sewing machine bench which are placed at a convenient angle so that the worker can store a certain quantity of the goods which she has in hand. Tidiness is thus served and confusion obviated.

Precautions are taken in regard to the correct lighting of the work. It often happens that in a room generally well lighted the various sources of light seem to neutralize each other and create dark shadows in the vicinity of the task. Reflectors are now used, and the light rays can be gathered by this means and concentrated on the work. This apparently minor matter is of great assistance and a good view of the task facilitates its efficient execution. Attention to those matters effects a great improvement in the phyisque of the operators, the eyesight is preserved, there are fewer bent shoulders and the work is conducted with greater zest.

A safety precaution is that the shafting on the sewing machine bench is now enclosed and is quite silent in operation, while the risk of flying oil drops is obviated. The individual motor is now being fitted to sewing machines in increasing numbers, with a small motor it is possible to get a quick start and only the power required is absorbed.

In the sewing and seaming machines now employed there is an increased use made of the mechanism having two needles, one of which works at the usual speed, while the second draws in or tucks the fabric, as for example in "flouncing." In the case of the shell stitch one needle



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possess all modern improvements, including selvage welt, French welt, double knee dogless and striping attachments, with automatic stop motions.

Built in all sizes for all classes of rib work.

We also build hosiery knitters and Body machines for underwear and various other circular machines for all kinds of knitted articles.

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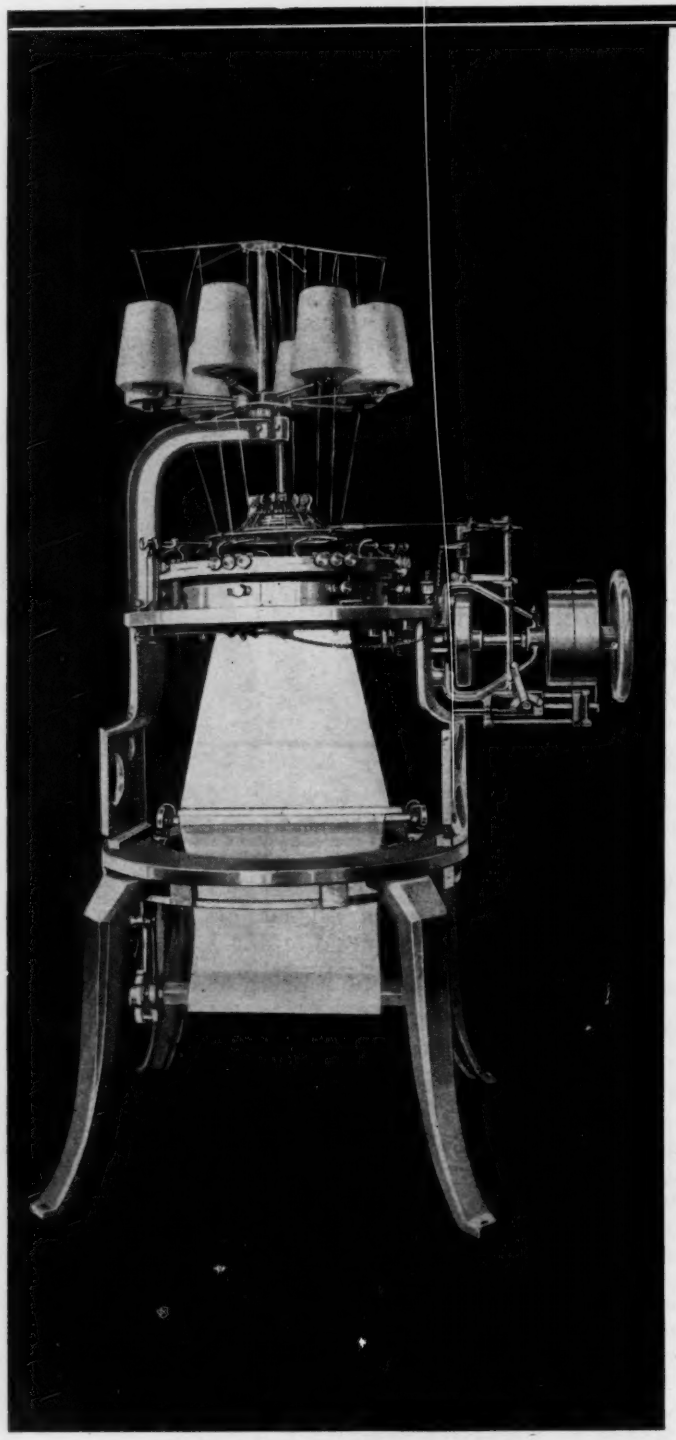

Made to Meet Your Requirements

The Wildman Spring Needle Body Machine has been developed to meet the exacting requirements of the trade. In the hardened steel needle cylinder on the Wildman, the cuts are accurate to 1/1000 of an inch—a guarantee of faultless fabric.

Changes of stitch are controlled by graduated micrometer adjusting screws which *stay* set. The new style ball-bearing take-up keeps the cloth under absolutely uniform tension.

Even yarn breakage is eliminated as far as is mechanically possible by the addition of the Wildman Furnishing Wheel Unit—supplied only with this machine. Illustrated instruction book furnished without charge.

We have issued a new edition of the complete and informative book, "The Science of Knitting." Price $2.00.

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NORRISTOWN, PA.

goes at the regular rate, while the other takes a jump after every ten stitches or so thus giving lace-like borders to the fabric and adding ornamentation.

Certain firms specialize in mechanisms for making the button holes on garments and recent advances show increased speed in this operation and particularly greater wearing service owing to the way in which fabric is left in the hole. The insertion of the double cord makes the hole more durable and quite firm. Ingenuous is the system of clearing away the fluff and fiber, in some of those varieties a suction pump is in operation and draws the loose pieces down a tube clear of the working parts. It would seem to be an advantage to have a similar device on certain knitting machines where the parts have to be cleared frequently to allow the operation to proceed.

Many firms have in a former period tried water softening plants but have had to abandon them owing to the skill required in the operators to work them. The constitution of the water had to be tested from time to time and the quantity of softening ingredients. In the newer plants for water softening the operation requires much less technical skill than formerly, for now the salt is put in to allow the re-generation to proceed, and it automatically adjusts itself to the kind of water coming through, the only difference being that it may use a little more or less salt. Today the lime soap precipitated when hard water is used in scouring gives very unsatisfactory results in dyeing and finishing, particularly in the case of delicate shades. This is the foundation of many of the stains and impurities in knitted fabrics.

Considerable attention is being directed to a bobbin where the disadvantages of chipping are minimized if not entirely removed. The bobbin is coated with a substance which cannot be chipped; although it may be dented it never breaks the surface. In ordinary bobbins even after a first use are chipped by being allowed to drop on the ground and catches the yarn and causes presses-off on the machine. On the high part of a bottle bobbin also there are often ridges which trap the thread and cause waste. This part of the bobbin is now covered with a felt-like substance on which the artificial silk thread exercises some grip so that the last inch of yarn is withdrawn quite readily. In many cases the workers use a knife to cut into the wood of a bobbin and get off the remaining silk, but this composition cannot be cut nor does it require to be, for the silk comes off completely as required.

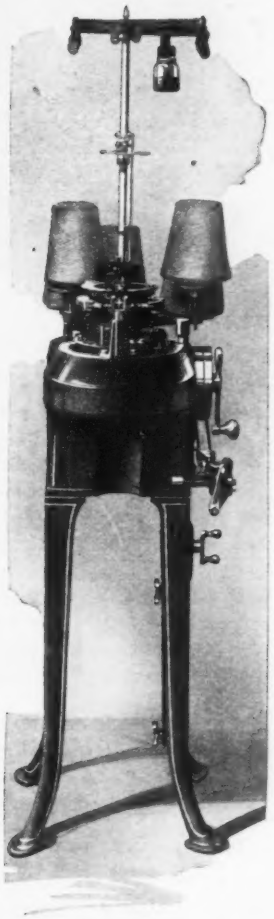
Hosiery manufacturers frequently have to buy their supplies of artificial silk from a yarn agent and employ the full range of colors offered. It follows that as this range is being offered to all his competitors, there will be a similarity of color aspect for many grades of goods. In some instances it is found an advantage to employ a twisting machine where artificial silks may be doubled and twisted in any order of color or in any number of singles required by the fancy of the manufacturer. Machines are now available where the construction is simplified and any number of colors up to 5 or 7 are used to give special effects. The degree of twist can be varied from ½ turn per inch to 40 turns per inch and by this means a wide diversity of effects are producible.

"Energy without purpose is waste of effort."

17

Instead of

12



The extreme width of the Standard Hosiery Machine is only 16". Measure this on a rule,—it will give you a clear idea as to the small size of this high production machine.

Seventeen Standard Machines can be placed on the space required by 12 of other makes.

Aside from the other exclusive features of this machine, this one alone is of vital importance and worthy of consideration.

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THE Reading Full-Fashioned Hosiery Machine *looks* and *is* a sturdy American product designed for service and efficiency.

It is used by virtually all manufacturers of ladies', fine, full-fashioned, silk stockings.

TEXTILE MACHINE WORKS
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The
"READING"
FULL-FASHIONED
HOSIERY MACHINE

Wishes to Stop the Oil Streaks.

EDITOR COTTON:

We use in our factory Scott & Williams Model K, 240 needle machines, and we have observed that a large part of the hosiery manufactured have black oil streaks in the transfer and in the heel and toe. We can hardly dye this material in light colors since these streaks will still show after dyeing. Therefore we should like to know just what process to use that we may do away with these streaks, and just what quality of oil we should employ in the cylinder for the needles so as to avoid these streaks.

CONTRIBUTOR No. 1425.

Wants Rule for Setting the Sinkers.

EDITOR COTTON:

We have just installed ten second-hand Scott & Williams B5 220-needle machines, and are having some trouble with them cutting holes in the gore, and also in cutting out in the heel and toe. This is due, I suppose, to the fact that the sinkers are not set properly. Would someone be kind enough to advise me, through "Knitting Kinks" if there is any rule for this setting, and make any further suggestions that might be of assistance in this difficulty? We also have trouble in getting the double sole to plait on the edges where the double sole yarn goes in and out; the cotton yarn comes on the outside more than the artificial silk.

R. M. (GA.)

Using and Adjusting a Model K Machine.

EDITOR COTTON:

This article will consider the Model K Scott & Williams knitting machine. Its purpose is to take up a large number of difficulties arising in the operation of this machine, suggesting in each case a remedy, based upon experience. As in the previous article dealing with the Model RI machine, these problems will be considered separately. The occasional numbers given are to identify the parts and are from the parts catalog of the K machine.

Fitting a Pawl Controller Shoe No. 7426.

When putting on a new pawl controller shoe, the machine should be racked around just before it comes to the four graduated links. Take the machine through by hand on these four kicks to see that the main pawl makes each of these four kicks separately. If the shoe is set too far down, the main pawl will make more than one kick, and if not far enough it will not make the kick at all, throwing the chain out of time. The adjustment of the shoe is made by screwing either up or down on the set-screw located immediately on top of the shoe.

After this has been done, the machine should be set over, and taken through by hand on the set-up to see that the main pawl makes the proper kicks.

If the chain pawl does not give the proper throw to agree with the changing links, the chain pawl should be set ahead or back as the case may require.

It is sometimes necessary to take a little off of the front or back of the pawl controller shoe to prevent it from hanging on the end of the links when going through the changes, otherwise extra kicks will be made, resulting in trouble.

Fitting a Drum Pawl.

When fitting a drum pawl, care should be taken that the left side of the pawl does not come in contact with the drum cams that control the seam mark lever, otherwise the pawl will not make the proper kicks. The remedy is to grind a little off the left side of the pawl, just enough to clear it.

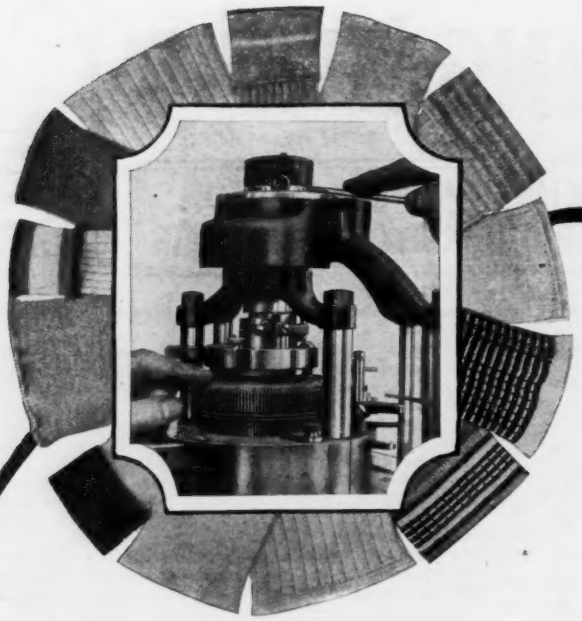
Before taking the pawl off of the bracket, notice should be taken of how long the pawl is, so that the new pawl can be set as near like it as possible. It is necessary to adjust the pawl after it is put on, backward or ahead as the case may be.

Setting of Main Pawl.

The first thing to take into consideration in setting a main pawl is to get the clutch No. 6011 to shift freely from an oscillating to a rotating motion without binding. This is accomplished by setting the main pawl ahead or back, as the case may require.

If the thrust bars do not drop off of the drum cams when going through the various changes, or if they drop off too soon, the proper adjustment is secured by the adjusting screws of the pattern drum driving the gear No. 6040, setting them ahead or back as required. The machine should be set over until it transfers off of the toe, then taken through by hand, for the next kick which cuts the toe thread off. The yarn shear thrust bar should just drop

We invite our readers to make use of this department for the discussion of any and all problems arising in connection with the knitting mill from the office to the packing and shipping departments. Questions, answers or letters need not conform to any particular style and will be properly edited before publishing. All questions will be answered as promptly as possible. The names and addresses of the contributors must be given, but will be held in confidence and a pen name substituted when printed. All accepted contributions other than questions will be paid for after publication. The editors do not hold themselves responsible for any statements of opinion or fact which may appear in this department unless so endorsed. This department is open to all.



See how easy it is to "pick up" fabric on a Universal. The screwdriver raises the dial cap a full $\frac{1}{8}$ inch—without adjustment of the dial—gives ample space to work and registers perfectly when back in position.

Cut The Cost of Making Tops!

YEARS ago Benjamin Franklin said, "Save the Pence and the Pounds will take care of themselves." That is true in manufacturing hosiery today—save pennies in production costs and dollars of profit will follow.

Just think—on hosiery production of $1,000,000 a saving of 1% in production cost means the same to you (in profit) as an additional volume of $125,000, figuring the large net profit of 8 per cent. And nowhere is it easier to cut production costs than in the manufacture of tops.

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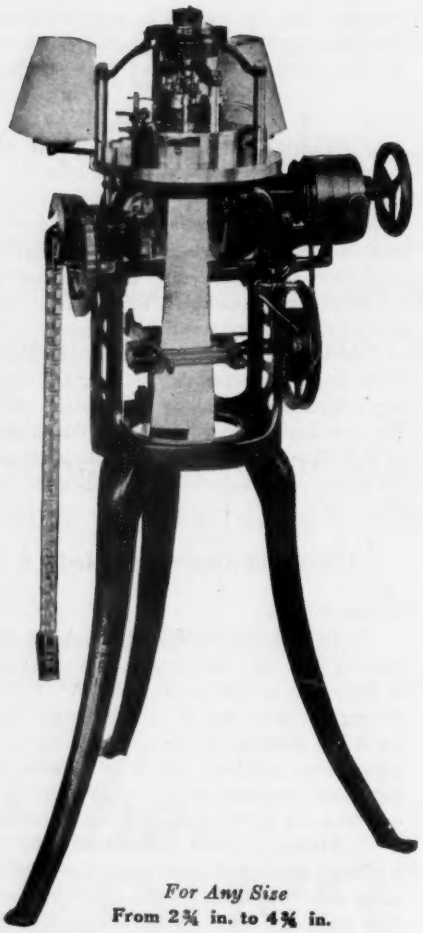
Every part and every motion of the Universal Ribber reduces cost. For example, the dogless has no vibrating parts—repairs and delays are eliminated. "Picking up" is made easy by the free vertical movement of the dial found in no other ribber. To inspect an *entire section* of the dial simply loosen one thumb screw. A loose course plate reduces needle breakage. Heads are interchangeable without new dogless parts. Take-up gears entirely enclosed prevent oil spots and seconds. One-piece frame increases rigidity. The Universal operates with less noise, less vibration and less attention, cuts down waste and irregulars and best of all cuts production costs.

We have actual figures made in operating mills proving these claims. Ask us to send them



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off the end of the shear drum cam when the kick is completed.

The next adjustment is to take the machine through the set-up to see if the auxiliary racking pawl makes the proper kicks, setting the pawl ahead or back as the case may require, if it does not make the proper kicks. The adjustment of the main pawl should not be changed, because by so doing it will be thrown out of adjustment when shifting from one motion to another.

Fitting a Left-Hand and Right-Hand Up-Pick.

The main requirement of the up-pick is to have the end of the picker fit into the slot in the stitch cam. The end of the picker should lay down in the stitch cam as far as possible to allow the short butt needles when riding over the side of the cam, indicated at *A* in the accompanying sketch, Fig. 1, to engage the picker as shown, thus throwing the needles out of action. If the picker does not lie down in the stitch cam below the point *A*, the needles will not engage in the picker, breaking them off.

FIG. 1

To get the adjustment for the picker, adjust the up-pick cam up or down as the case may require; take a little off of the bottom of the end of the picker to allow the picker to lie in the cam, not taking off very much because the end of the picker will break off.

Sometimes a new picker will bind in the up-pick stud, which will cause trouble. The picker, for best results, must work "snappy." The remedy is to take a little off of the sides of the up-pick so that it works freely.

The up-picks, as they come from the factory, are too wide on the part that picks up the needle. It is necessary to grind this down so that it is "a hair" wider than the butt of a needle. This is important, because if it is left too wide, and the butt of the needle happens to be bent a trifle, the picker will pick up two needles at a time instead of one, making the machine come out unevenly in the corners of the heel and toe.

Fitting a Down Pick.

The down picks, as they come from the factory, are made for the coarse gauge machines, and must be cut down to fit the 3½- and 3¾-inch machines. To do this, grind the length of the picker so that it is the same length as the old one, and then grind the sides of the picker so that they measure approximately 5/64th on both sides for a 3½-inch 240-needle machine, rounding off the top of the picker the same as the old one. Polish up the picker as smoothly as possible, taking off the burrs in the corners. This can best be done with a fine cutting stone. This is important, because in picking the needles down, the butts of the needles will cling to the slightest burr, causing them to be pulled out of the slots in the cylinder, breaking them.

The down pick generally must be tried three or four times to get it just right. If the picker is too long it will bind on the cylinder. If too short, the needles will not be picked down far enough, causing them to be broken off on the stitch cam and back center cam.

Fitting a Stitch Cam Bracket.

In putting on a new bracket, gauge up the stitch cams first to see that they measure 13/16-inch from the bottom of the stitch cam to the bottom of the bracket. For the right hand stitch cam the bracket must be slotted down toward the bottom of the bracket in the screw hole to allow for the throw of the cam when the machine is on the fashion marks. Nothing should be taken off at the top of the screw hole, as this will throw the gauge of the cam off. It is especially important that the gauge for the stitch cams be 13/16-inch.

The pickers must fit in the slots of the stitch cam, and if not, should be adjusted so that they do fit properly.

In the set up, the machine should be taken through by hand to see that the butts of the needles do not catch on the right point of the right stitch cam. If they do, the remedy is to take off as much as is required to clear the point.

The right stitch cam must get a full throw for the fashion marks, otherwise fashion mark trouble will result. The stitch cam will sometimes bind on the bracket. Then it is necessary to grind a little off of the side of the stitch cam to allow it to move freely.

Fitting a New Welt Presser.

The welt presser, when going in on the hem, must go in at least ¼ inch under the jack dial to work the fabric down. If it does not go in as far as this, the hem will get puckered up. If the presser goes in too far the loops will be thrown off of the jacks. The throw of the presser should be set by the set screw so that it goes in ¼ inch under the dial when on the hem.

If the spring on the presser is not stiff enough, the welt presser will not stay in and will have a tendency to flop out, causing a puckered hem. The remedy, of course, is to stiffen the spring or change it.

When on the splicing, the presser should be in as far as possible to prevent the splicing thread from throwing over. If it is set too far, the presser is apt to rub on the hooks of the needles, ruining the needles. When setting the presser in on the splicing, thought should be given to the effect it will have on the hem. Sometimes when making the adjustment for the splicing the presser will be in too far when on the hem. It is then necessary to take some off of the drum cam that controls the throw of the presser when on the hem, to let it out a little.

When putting on a new presser, it should be adjusted so that it is next to the bell when on the splicing. This is important. If the rod is too far away from the bell, the bell does not ring when a needle breaks, causing a bad smash-up. This should be adjusted when on the splicing only.

Fitting an Outside Sinker Ring.

The outside ring should be set so that the splicing cams come over the long butt needles. Raise up the first medium needle next to the short butt needles on both sides, then project the ends of the splicing cams evenly beyond the medium needles on both sides. The slots in the ring should be square in line with the inside sinker ring so that the sinkers work freely, and then the clamps tightened. Care must be taken to get the ring down square, otherwise a crooked stocking will result.

Fitting an Inside Sinker Ring.

Before putting the inside ring on, the solder should be scraped off the top of the cylinder, so that the ring will lie squarely. The clamps should be used for holding the ring steady while soldering, and a piece of cardboard put

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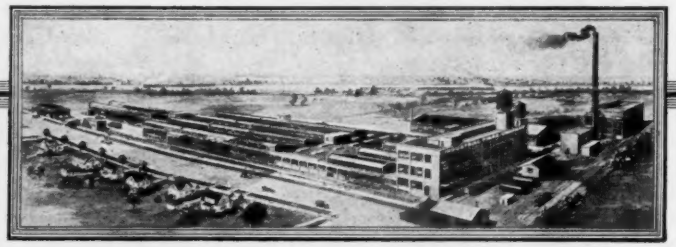

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under the top of each clamp to prevent jamming the walls.

It is of the *utmost importance* to get the needle slots in the inside ring in perfect alignment with the cylinder slots. If they are not in line, when the needles are raised they will go to one side resulting in the ring having to be unsoldered, then resoldered again. The ring must lie squarely on top of the cylinder, or the result will be a crooked stocking.

Fitting a Chain Pawl.

When a new chain pawl is put on, it should be held over to the right as much as possible, and the screws tightened. This is necessary because as the chain links with the hump pass the pawl, the pawl lying too close to the link, is apt to ride on top of the link, throwing the chain out of time. Care must be taken to get the pawl adjusted so that it pushes the chain sprocket far enough so as not to hang on the end of the link after the kick has been made, which would result in an extra kick. The kick of the pawl should bring the links with the humps next to the ratchet pawl lifter plate when ready to make the change. The drop-off should be adjusted when the kick is completed.

Fitting a Center Cam.

When putting on a new center cam, the right side of the cam must draw the needles down soon enough in the right corner of the throat plate, otherwise the latches will fly closed, causing drop stitches. Also, when the machine is on the heel and toe, the butts of the needles are apt to get caught on the ends of the center cam, breaking them off. The remedy is to grind the ends of the center cam according to the conditions.

Most center cams, when put in new, draw the needles down too low as they pass the throat plate. This results in the needles not being high enough to catch the thread as they are going through the yarn changes, causing cutting out on the various yarn changes. To eliminate this, take a little off of the bottom of the center cam, but not too much, because then the butts of the needles will get caught on the right point of the left-hand stitch cam. Taking off too much will also throw the splicing dividing cam out of adjustment. Also, if too much is taken off of the bottom of the cam, the hooks of the needles will ride too high resulting in the ends of the yarn changing fingers hitting the tops of the needles when going through the changes.

Fitting a Left-Hand Stitch Cam.

The only thing to be taken into consideration in fitting a left-hand stitch cam is the left-hand up-pick. This must fit into the slot of the cam. Sometimes a new cam is a little longer than the one taken out and the butts of the needles will bind between the bottom of the stitch cam and the side cam. The side cam should be knocked out just enough to allow the butts of the needles to pass without binding.

Fitting a Right-Hand Stitch Cam.

When putting in a new right-hand stitch cam, four things must be considered: Fashion marks; set up; up-pick; and center cam.

The top of the stitch cam must be high enough to raise the needles so that the latches of the fashioned needles will cast off their stitch on this high point. Otherwise, fashion mark trouble will result as the machine transfers off of the hem. This point is very important. As the stitch cam drops when on the fashion marks, if it does not drop low enough the machine will not make all of the fashion marks.

The right end of the right-hand stitch cam may be either down too low or up too high. When the machine is going through the set-up, the needles are apt to get caught on this point, breaking off. When grinding this point, it should be considered that the stitch cam tips when on the fashion marks, so if too much is taken off of the right end of the cam, this end will tip too, breaking the butts off of the needles.

The end of the up-pick may not fit in the slot of the stitch cam, resulting in breaking needles when on the heel and toe.

If the stitch cam raises the needles too high, the butts on the cylinder needles will come in contact with the right end of the center cam, breaking them off.

Throw of Dial Needles.

The jack dial is vertically adjusted by a nut 6872—6871, threaded on the spindle 10087. The transfer cap 5546 should be adjusted to just clear the dial without creating undue friction between these two parts. If for any reason the cap is vertically adjusted, a compensating adjustment should be made on the dial levers 8266 and 8267, which should just clear the short butt bits, when depressed to take the long butts. It is of importance to make these adjustments on the dial levers when raising the dial up or down; otherwise, breakage of butts of the transfer jacks will result. Means for changing the adjustment of the dial levers are accomplished by adjusting the eccentric studs 6898 on the end of the dial levers.

In the next letter the subject of operating problems will be discussed. RYMI.

Uneven Winding Causes Plaiting Trouble.

EDITOR COTTON:

Regarding the question of "Contributor No. 192" on plaited vertical stripes on ingrain goods, will say that I have had considerable experience with this class of work.

I note that he is having difficulty with his winding. Our winding is done in two separate operations. The skeins are wound dry from the swifts to the spools. The spools are stored until needed and are then wound over lather rolls to the cones.

It is my opinion, based on experience, that poor plaiting is almost always caused by varying amounts of moisture (lather) in different cones, rather than by any unevenness in the tension in the silk as wound on the cones.

It seems to me that silk wound from swifts is bound to vary in tensions because the swifts themselves require varying amounts of pull to turn them due to varying brake friction and also the silk in the skein frequently catches on little snags just enough to tighten the winding without breaking the thread. I think that such variation is largely corrected in our second winding operation, the cone winding, because there the only pull is picking up the silk, not turning the spool.

I hope that these experiences will be of some value and lessen the difficulties for "Contributor 192."

J. J. E. (MASS.)

EDITOR COTTON:

In a recent issue "Contributor No. 192" outlines a difficulty he is having with uneven tensions from his winding machine. From the description which he gives I do not believe it will be possible for him to produce two packages

of yarn giving the same tension on the ends.

This contributor states that he is winding bottle bobbins on Oswald Lever skein winders on which the yarn passes through porcelain guides, over an oiling trough and through a knot catcher, the drag on the swift being regulated by a weight which hangs from the center of the swift on a leather strap. The tension on the ends, it would seem, would be the same insofar as the porcelain guides and the oiling trough is concerned, but he is liable to get more or less tension on account of the knot catcher or slub catcher, as it is sometimes called, depending upon how closely it is set. When a knot reaches the knot catcher, the end of yarn, of course, would be tightened up. The weight of the yarn on the swift would be constantly changing from a full skein to an empty skein, which is another thing that will affect the tension on the ends of yarn.

Apparently "Contributor No. 192" wishes to get the same tension on two parallel ends, and I am convinced that he will never be able to do this in winding from skeins. There are two ways in which he could accomplish the result desired. One of these is to continue to use his present winders to wind the yarn onto bottle bobbins as now and then install a Foster parallel winder winding two ends from two bottle bobbins onto one cone or bobbin.

If "Contributor No. 192" does not wish to have the two ends wound parallel to the same bobbin, he could secure the same result by rewinding his bottle bobbins on a winder built for that purpose. In any event, I am convinced that he will have to use a second process of winding after he gets his yarn on the bottle bobbins from the skein in order to get an even or equal tension on all bobbins or cones so that the runoff on his knitting machines will be equal and unchanged. CONTRIBUTOR NO. 925.

EDITOR COTTON:

Regarding the trouble which "Contributor No. 192" is having on reverse plaiting, will say, this trouble is due principally to the winding in the first place. If he is getting irregular tension on the bobbins or cones the same will reflect upon the knitting machines, and it will be found on close investigation that the skeins being wound from are not of the same fit on the winder reels or swifts. Some will be of a little larger diameter than others and cannot be controlled equally by weighting the swifts, as while weighting the swift for a skein a little larger at the time, perhaps the following skein will not need the same weight on the same swift, and the winder operator is not able to control this variation.

The idea is to have the yarn equalized between the bobbin and the swift.

This is how I overcame the problem. I put on a compensating tension, called the Pidgeon yarn take-up and had the yarn passed through this take-up before it reached the knot catcher.

Running yarn through oil on the winder is of no benefit in regard to equalizing the tightness of the bobbin. It might soften the yarn, but it would be very little. The least oil on the yarn the better it is at any time.

I would suggest that "Contributor No. 192" write for a few of these tensions for trial and apply them between the reel and knot catcher and take the jump out of the yarn. An even tension being put on the yarn will make a uniform bobbin, and the plaiting trouble caused from one soft bobbin and one of tighter tension will be overcome and the friction on the swift on the winder can be reduced. The writer had some of the same trouble and overcame it in this way, which would probably solve the problem "Contributor No. 192" is experiencing. I would be glad to know, through this department, how he makes out.

BOB (CANADA)

EDITOR COTTON:

In reply to "Contributor No. 192" I am inclined to believe that the seat of this gentleman's knitting problem is in the winding. We must be mindful, however, of the fact that reverse plaiting on fancy fabric is an extremely complicated proposition.

Personally, I rather doubt his ability to get practical results with the skein winders he is using. During the last ten years I have had more or less experience on all makes of artificial silk winders, and taking everything into consideration, I think the Huse winder is about the most dependable machine for this class of work, especially their latest type.

However, if we were to suggest to your inquirer that he discard his winders and buy new ones, we would probably get the name of being a poor doctor, and as it may be necessary for "Contributor No. 192" to proceed as best he can with the equipment at hand, I would suggest that he reduce the speed of his knitting machines to 210 to 220 revolutions, putting an overhead hanger on the machine to hold the inside yarn bobbin top end down, thus eliminating the drag and equalizing the tension. This yarn should be on a bobbin by all means, as I do not think he could successfully operate it from a cone.

The artificial silk, which I assume is to be used on the outside, can be run in the usual way, but should be slightly frictioned with an equalizing tension.

This arrangement has given us very satisfactory results, but it is my experience that the very best of winding is absolutely essential to make the knitting machine operate successfully on reverse plaiting.

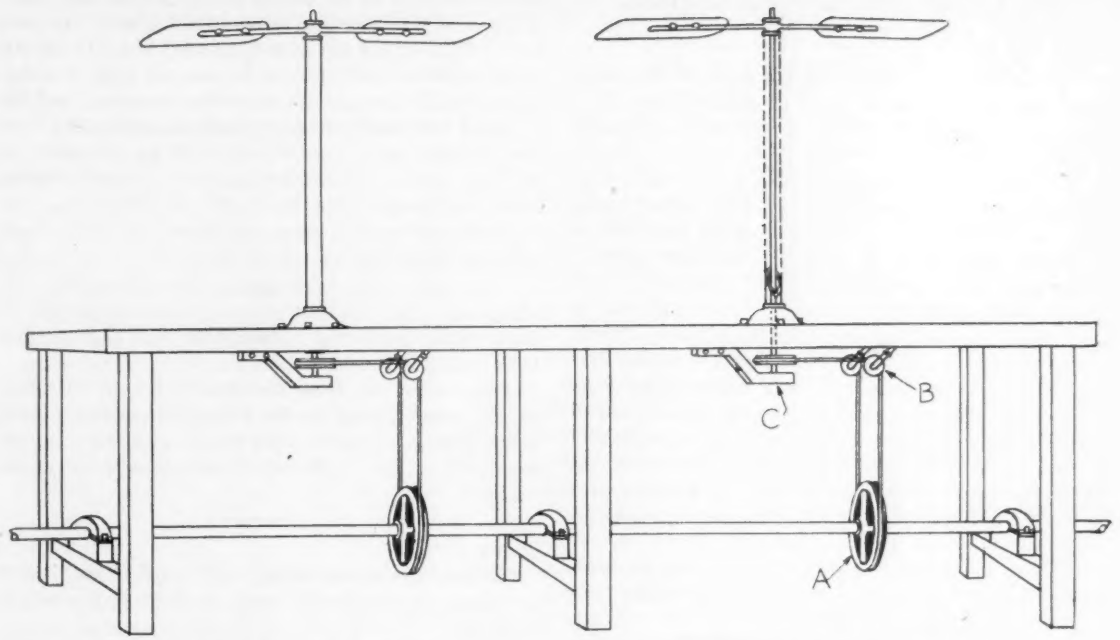
It will be interesting if "Contributor No. 192" will tell us how he finally overcomes his difficulty. N. M. (N. H.)

Why Do the Sizes Vary?

EDITOR COTTON:

Can the readers of "Knitting Kinks" give me any information as to how to control sizes on three end thread silk plaited over 150 denier fiber silk. We have some trouble in keeping the size the same at night as in the day. No certain machines do this, but all of the machines may show the correct sizes on the day run but the size has a tendency to tighten up at night.

We use Double crack x x thread silk, which seems to be about the best obtainable. It would seem that the humidity at night would cause this trouble, but if this is so, why should it occur on some machines this time and other machines the next? Then, again, it would appear that the cylinder was not down when doing the sizing in the day, but it is not so in this case, as each one is examined for that trouble. No tensions are tampered with, neither does the thread get wrapped around anything, but yet a machine here and there will knit tight. We use Scott & Williams machines. Any suggestions the readers can give us will be appreciated. A. B. C. (N. C.)



A Fan for the Looper Table.

EDITOR COTTON:

I am writing to describe a home-made fan for looper tables and other work tables in the knitting mill. It is easy and inexpensive to make, and requires little additional power.

The average mill mechanic will understand how to make and erect such a fan from the accompanying sketch. A round belt is used, going around a grooved pulley on the shaft underneath the table, as at *A*. This is a quarter-turn belt, going through two sheave pulleys on hangers *B*. These hangers are simply made from angle iron and fastened underneath the table. A support for the fan shaft, shown at *C*, has a hole bored part way through. The upright shaft is a half-inch spindle, and has a grooved pulley fastened to the lower end, around which the belt passes.

The upright shaft extends through a hole bored in the table, and is encased in a piece of ordinary pipe, which screws into a pipe flange on the table. The upper bearing for the spindle consists of a cap screwed into the top of the pipe. Regular ladies' hose boards are used for the fan blades, which are secured to the spindle by means of arms.

The point in favor of these fans is that they don't cost much, and can be speeded so as not to disturb the lint caused by looper brushes, etc. The usual electric fan runs too fast. These fans can be made of any desired height. They require practically no attention. There is no extra wiring. When cold weather comes on the round belt can be thrown off, and the fan remain idle until needed.

W. H. H. (GA.)

"Trade Stability and How to Obtain It," by Sir Charles Macara, is the title of a book recently issued by this internationally known figure in the textile industry. It consists largely of a compilation of articles written for various publications and dealing with various phases of the industry's problems, with this writer's opinions as to the solutions.

Degumming Silk for Dyeing.

EDITOR COTTON:

I should appreciate very much your advice, through the medium of "Knitting Kinks" regarding certain difficulties that have arisen in our dyeing department.

Just a few months ago we began to operate a hosiery mill, and so you will not wonder at our endeavoring to obtain information regarding certain things which to older heads in the business may seem quite simple, and without our knowing the cause, give us quite a bit of trouble.

What we desire to know is the most practical and effective process for degumming hosiery knitted from natural silk, which, as the readers of "Knitting Kinks" know is the form in which we get the cones of this fiber ready to be placed on machines.

The silk that we have been employing in our mill is "Gum 10th Best 1, Japan Hosiery Tram," and after making up several dozens of this quality, we passed the same over to the dyers and they succeeded in dyeing them perfectly, but it resulted later that after dyeing and placing them on the Paramount forms, which is the make that we use, the hose turned out stiff and rough, due probably to the gummy state of the silk.

We have done the drying under twelve pounds pressure and have washed this lot of hosiery with different soaps, but have not been able, by any means, to remove the gum and bring out the softness and proper quality of silk hose. Upon dyeing this lot of hose we have dissolved in the wash 20 per cent of Monopol soap and 2 per cent of calcined soda. We have also noted that when the hose are perfectly dry, if we rub them together we succeed in softening them a little, but as soon as we dampen them and try to stretch them they again become stiff and hard.

We shall appreciate having some of your readers advise us through "Knitting Kinks" as to the process we should follow in order to remove the gum and to obtain the softness and quality which such silk hose should have.

CONTRIBUTOR NO. 1425.

Why Latches Bend on Pineapple Stitch.

EDITOR COTTON:

Bent latches in making pineapple stitch in 200-needle ladies' hose on Scott & Williams K machines were mentioned in the question of "D. T. (N. C.)" in a recent issue of COTTON.

This sort of work will cause this trouble more than ordinary work, because, as he says, every other needle must have a long latch. However, I would like to offer the following suggestions in connection with the problem:

The top corners of the throat plate should be rounded off and polished off half-way down. This trouble usually comes when the needle passes under the stitch cam in the reciprocating motion on the heel and toe. It may not start this trouble the very moment it bends, but it will later on. I believe this man will find that seven out of every ten of these bent latches are bent toward the right-hand side, with the back of the needle held toward him. This shows that the trouble comes from the throat plate not being rounded enough and the long needle latch will come down and hit it too much.

It should not be rounded off more than half-way down, however, as that would cause the yarn to get away from the needle and make drop stitches.

Another thing we have done that would help in this is to change from the old-type head to the new spring head, and put in the cut-back sinkers. This would aid a whole lot toward preventing the long latches being bent.

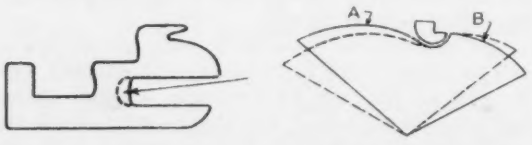
F. A. R. (N. C.)

EDITOR COTTON:

Regarding bent latches in making pineapple stitch work, about which "D. T. (N. C.)" asks in the August issue of "Knitting Kinks," will say that I have had considerable trouble along this line, and have overcome it entirely by using 48 gauge, No. 97 cylinder needles, instead of No. 93, which "D. T." is using at present.

I am taking it for granted that "D. T." is using the newer style sinker tops for this work, and using the newer style special fashion mark sinkers for the tuck stitch work, as shown in the sketch. The difference between the regular sinker and the special fashion sinker is that the latter is cut away a little more as indicated by the dotted line, which allows room for the latch to close without hitting the sinker.

On the No. 97 needle, the latch is a trifle shorter than the No. 93, and would not be apt to make a plain tuck due to this fact. In order to make the No. 97 tuck it is



necessary for the top level of the right-hand stitch cam to drop lower to make up for the shorter latch. This depends upon how the stitch cam lays in each individual machine, hardly any two being alike.

Referring to the illustration herewith, as the stitch cam is in its lower position to tuck, point *A* may be higher than point *B*. This of course would hold the tucking needles too high at this point. It is not advisable to take any off the top of point *A*, because by so doing, tucking trouble willl result in the hem and foot. If the pin screw in the stitch cam is not down to the bottom of the slot, the left point of the stitch cam is hitting on top of the lower center cam. Take a little off the top so it will drop lower. If the pin screw is down to the bottom of the slot, and point *A* is still higher than *B*, then take the stitch cam bracket out and file the slot a trifle lower, which produces the same result. Care must be taken not to take off too much, as this results in the right point of the stitch cam swinging higher, causing the butts of the needles to break off. If this results, make the right point a little lower, not taking off too much, as this causes trouble on the set-up.

If the point *B* is higher than *A*, then take a little off, taking care to see that the picker lies down in the slot of the stitch cam low enough to engage the butts of the needles when on the heel and toe.

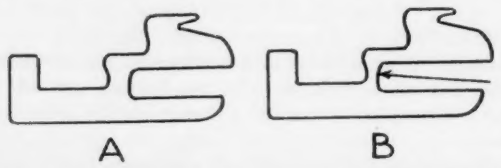
I have gone into detail to show "D. T." the difficulties he may have by using the No. 97 cylinder tucking needles in order to get them to tuck, but by changing over one machine at a time, I am sure it will get him out of his trouble.

RYMI.

EDITOR COTTON:

Recently a subscriber asked a way to reduce bent latches in making pineapple stitch work, on Scott & Williams K machines.

Our method for overcoming this is to file the sinkers in the manner illustrated in the accompanying sketch. *A*,



as you will recognize, is the usual shape of the sinker, but we file ours as shown in *B*, at the point where the end of the latch catches. This allows the latch to come out without bending. I believe if the reader will try this it will help solve his problem.

A. C. (N. C.)

Holes in the Sinker Line on Drop Stitch Hose.

EDITOR COTTON:

I note in a recent number of COTTON where a correspondent is having trouble in the manufacture of drop stitch half-hose on an Acme machine with occasional stitches throwing off, which makes a hole in the sinker line. I would advise "T. T." that in the particular hose which he submitted the hole was caused by the needle. There are three things which will cause this. I take it for granted that the stitch cams and end cams are smooth and free from nicks and rough places. Be certain to see that the center porcelain tube is close enough to the needles. Also see that the swing cam has no nicks or rough places and that the spring on this cam is not too strong. Then look at the tumbler cams. These cams should be so polished that they will drop of their own weight, and the springs on these cams should be just as light as possible, as strong springs on these cams will cause trouble. When the springs are too strong they act as resistance to the needles and cause the latches to fly up. Also, see that the tumbler cams are even with the end cams; in other words, they should not be below or above the end cams.

As one of the readers of "Knitting Kinks," I shall be

glad to have "T. T." let us know how this trouble works out and whether any of the suggestions help him with his difficulty. OLD KNITTER (PA.)

The Cause of the Sinker Streaks.

EDITOR COTTON:

In answer to "K. R. (N. C.)," who asked in a recent number concerning sinker streaks on 200-needle goods on Model K machines. There are numerous things that will cause this. The points may be bent a little, sometimes there is lint in there, or under the sinker. Perhaps it might be a needle that is doing it, and it looks like the sinker on account of lint in behind the needle. If the needle has too much or too little friction it will cause this. The sinkers may be set too far forward or not far enough.

I have always used a 48 gauge sinker and needle for this 200-needle work with satisfactory results.

R. S. (N. C.)

EDITOR COTTON:

Replying to "K. R. (N. C.)," who desires information for stopping sinker streaks.

Sinker streaks are caused by many things. They are especially more conspicuous in a looser stocking than in a tighter one, due to its loose stitch, which is part of "K. R.'s" trouble, in his attempt to bring the weight per dozen to 18 ounces.

With the Scott & Williams newer style sinker tops and sinkers, little trouble should be had, as the sinker band around the sinkers gives an even pull on all the sinkers. However, I suggest the following: Be sure that there is no variation in the throats of the sinkers. The left-hand sinker cam may be set inward too far, causing the sinker to strain the stitch. This cam should be set so that the back of the needle is even with the throat of the sinker, as the needle rises. The sinker slots may be bent. The sinker slots may be stuffed with lint. The sinker top may be loose from the top of the cylinder. The cylinder needles must be in a perfect line. The left-hand side cam may be too far away from the stitch cam, or it may be nicked up.

If these suggestions help "K. R." I should be pleased to have him advise us through "Knitting Kinks."

RYMI.

Winding-off, Twist and Shrinkage Troubles.

EDITOR COTTON:

I have several problems I would like to have discussed in "Knitting Kinks." In the first place, we get our silk yarn on waxed cones which have spherical tops. Occasionally, I might say frequently, some of these cones will be apparently mashed in on top, which gives us trouble when knitting off, although we use the ballooning device. I have taken this up with the people who furnish the yarn, and they claim that no such imperfect cones leave their plant, and while I am not satisfied with their explanation, I have been unable to find yarn that does not occasionally come this way.

As a remedy for this, I have conceived the idea of an ordinary wooden knob, to be inserted in the top of such cones, the thought being that the yarn will drag around this knob pretty much as it would around the top of the cone were it in a perfect condition. The knob, of course, must fit closely to the cone and should be somewhat larger than the cone. What do your readers think of this, and have they any suggestions?

We have been running some 1x1 combination—one strand of 150 denier double-end artificial silk and one strand of pure silk twisted—using this in the high-splice heel and double sole, plaited on a 60s or 70s mercerized. Our difficulty was in the plaiting. We thought at first it was a mechanical trouble, but finally decided to change from the standard right-hand twist in this yarn to a left-hand twist, and this plaited perfectly. After a while, however, the throwsters charged us a premium of ten cents a pound for the left-hand twist, and as we didn't want to pay this, we went back to the right-hand twist. We have moderate success with this, but are not satisfied, and any reader with experience on this work will please us by giving any information to help. We make this goods on a 240-needle, 3½-inch Banner machine.

On this same number with the combination yarn we are having a great deal of shrinkage. For a while we ran nothing but mercerized, and got our boards all out of shape, and since going onto this work, the shrinkage is very bothersome. We carry 12 to 15 pounds of steam on the forms. The form manufacturer said our trouble was that we should run only three to four pounds, but when we cut it down to this as an experiment, it did no good so far as the shrinkage was concerned. I should be pleased to have some information on this, and if any readers want further information, will be glad to furnish it. R. R. T. (N. C.)

Sinkers Riding the Stitches.

EDITOR COTTON:

Several issues back you published a question about the sinkers riding the stitches on a Standard F machine on passing out of the heel. You have published some good answers to it, but here is another suggestion:

Sometimes the top of the cylinder is worn, which makes the diameter of the cylinder a little bit smaller. This causes the sinkers on the ring cam in the sinker head not to push the sinkers in far enough on the stitch. The writer has had this trouble in several mills, and sent the cylinders back and had them re-topped, and had no more trouble. This will give more trouble on loose work than any other, and the goods should be knit as tight as possible. Also, if the bumpers are not set right it will make the sinkers too fast or too slow. S. F. (N. C.)

Overcoming Cut Stitches on the Looper.

EDITOR COTTON:

Here is a suggestion on loopers that may or may not be familiar to your readers. Oftentimes, with fine cotton yarn and even with silk, a mill will have trouble with cut stitches on the looper where a slack course is used. This is the result of the looper not pulling down on the stocking and pulling the slack out of the stitch. The best way I have found to get around this is not to put such a heavy slack course in, but to merely use a mark around there. The purpose of it is to help the looper, and a smaller course will do the work just as well as a larger one.

D. M. T. (N. C.)

The Yarn Market

Actual prices quoted on the Philadelphia cotton yarn market during the past month, as it is considered here, indicated an increase in theoretical value. This bulge, however, in no way denoted an improvement in condition, either from the standpoint of transacted prices or in the movement of goods.

The market appeared to continue to exist along the desultory lines which have characterized it for several months, with not so very much satisfaction to either the selling spinners or the dealers, the latter being the point of contact whose job it is to talk the consumer up and the spinner down insofar as price is concerned. In explanation of that statement it may be said that there persists a disparity of opinion as to price between the spinners and consumers, and the dealer is trying to make both ends more elastic so they may more nearly meet. The position of the spinner is still firm, being the accumulative result of action on his part more or less recently, when he has refused to operate without orders, and usually without orders that will at least show him replacement. Along with this has been the fact that mill stocks are continuing to be reduced, as are stocks in the hands of the dealers, which puts more strength behind the stand of the spinning mill.

There is also an increasing tendency on the part of the spinner to fortify his position even more; cooperative curtailment and judicious operation is recommended, leaders pointing out that the present is an especially propitious time for the spinner to declare himself more forcibly than in the past. It is claimed by some that concerted action on the part of the spinner has had a marked influence upon market conditions during the past year or so.

With the consumer, conditions so far as the yarn market is concerned continue about the same, although during the past month a larger amount of inquiry has been reported. This would indicate a possibility of sales, ordinarily, but as a usual thing the most of the inquiry seemed to be for the purpose of feeling out the market.

The uncertainty and the large number of possibilities involved in near-future activities in raw cotton rates have been a large factor in the desuetude of the present situation. The business being done now appears of the hand-to-mouth trading character, initiated by business received from the customers of the customers. The yarn consuming factors apparently prefer the practice of buying yarns as they need them, and indications are they have been able to find what they want. In the future, however, as dealers are striving to impress, it may seem wiser to provide at least for a portion of minimum requirements ahead. The dealers argue for this practice from the standpoint that should declines occur, part of the then increased rate paid would be absorbed at the lower prices; while if, as they seem to think, the opposite trend should be taken, the user would be in a more fortunate position.

Two Government reports issued during our month had their influence on yarns, evoking some discussion as to the frequency with which these reports come out and the probable good result that might come from a reduction of the number of reports.

As for the future in the market, most factors are of the opinion that higher prices are in prospect. Light yarn stocks which obviously are held by users, almost a paucity of stocks at the mills of spinners, and very small holdings in dealers' hands, are calculated to have a healthful effect on rates. Dealers feel that consumers will recognize the situation from their viewpoint later, but just at this time they seem to feel there is plenty of time to cover their requirements as they come up.

The present situation, therefore, is a continued deadlock along the lines that the market has undergone for several months.

Prices on the Philadelphia market on August 16 follow:

Single Skeins.

4s to 8s	36	10s	37
10s	37	12s	37½
12s	37½	14s	38
16s	39½	20s	42
24s	43	26s	43
30s	44 @45		

Single Warps.

8s	36½	10s	37
12s	38	14s	39
16s	39½	20s	40½
26s	43	30s	43
40s	54		

Two-Ply Skeins.

8s	37	10s	37½
12s	38	14s	38½
16s	39	20s	40
24s	43½	26s	44½
30s	45	40s	54

Two-Ply Warps.

8s	36½	10s	37½
12s	38	14s	39
16s	40	20s	41
24s	43½	26s	44½
30s	46	40s	55

Frame Spun Carded Yarn on Cones.

8s	36½	10s	37
12s	37½	14s	38
16s	38½	18s	39
20s	39½	22s	40
24s	41½	26s	43
30s	44	40s	53

30s double carded 48
30s tying-in 42

Carpet and Upholstery Yarn in Skeins.

8s and 9s 3-4 slack 37
8s 3-4 hard white warp twist 36½
8s and 9s 3-4 tinged tube 35
8s 3-4 hard twist waste 33½

Two-Ply Combed Peeler Skeins and Warps.

8s to 16s	55	20s	56
24s	58	30s	62
40s	70	50s	78
60s	87½	70s	97½
80s	1.12½ @1.15		

Single Combed Peeler Yarn on Cones.

18s	48	24s	53
30s	61	36s	65
38s	66	40s	68

Mule Spun Carded Yarn on Cones.

10s	42	12s	43
14s	44	16s	45
18s	46	20s	48
24s	49	26s	50
30s	51	40s	59

Mule Spun Combed Peeler Yarn on Cones.

10s	50	12s	51
14s	52	16s	53
18s	54	20s	55
22s	56	26s	60
28s	61	30s	62
36s	64	38s	67
40s	70		

The Torrington Company, Torrington, Conn., has acquired the businesses of Chauncey A. Williams, latch needle manufacturer, of Manchester, N. H., consolidating two of the more important and well known needle firms in the country. The Torrington Company, in announcing the acquisition, explains that the consolidation affords the ability to manufacture a full line of coarse gauge needles in addition to the fine gauge needles produced under the "Excelsior" brand, stating they now are in a position to supply from the coarse gauge sweater needle to the newest "seventy gauge" needle. The business at Manchester, it is stated, will be continued under the same management, still being headed by Mr. Williams, and increased factory space and equipment will be provided.

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DESIGNED and built to effect important economies in the Knitting Industry through improved supply for knitting machines;—exhaustedly tested in actual mill operation, and its product successfully used under everyday working conditions, the No. 60-GF Cone Winder is indeed a winding machine masterpiece.

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These good needles —
Stop the leak of
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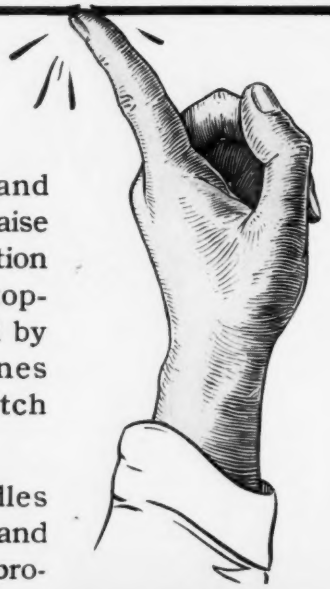

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These famous needles apply added machine and labor time to your production. This is money saved, procured through less yarn and needle breakage. The extra volume of production is one advantage — the increase in quality of production when Torrington Needles are used is another and direct addition to knitting profits.

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The Knit Goods Market

Toward the end of a comparatively quiet summer in the hosiery primary market there developed a degree of activity presaging a brisk Fall season. Production had been steadily increasing during the first six months of the year and distribution was at a stronger stage. Any decrease in output in July and August simply was in line with a more nearly even balancing of supplies with demand.

Production of cotton underwear was not so well maintained, but last month showed a material improvement in the market for heavy weights and for light weights for next year.

Sweaters continued comparatively inactive in August, but mills were receiving more repeat orders, and the knitted outerwear industry was given a tremendous lift by the season's business in bathing suits and fairly heavy jobber contracting for 1926.

Despite wage reductions in New England cotton mills and a slowing down in retail trade in the Pennsylvania coal regions, where there exists a serious strike menace, the knit goods markets show a healthy condition, with jobbers determined to continue the policy of restricting commitments to requirements for 30 to 60 days, except in juvenile hosiery and bathing suit lines, considerable spring business developing in both, and jobbers manifesting a better interest in Summer weights for next year.

Outstanding in manufacturing is the use of more silk and artificial silk for hosiery, less of the latter for sweaters and more of artificial silk for underwear.

Production of women's full fashioned silk hosiery in the first half of the year was larger by approximately 39 per cent than for the corresponding period of 1924, and output of women's seamless-made silk increased by 19 per cent, according to tabulation of manufacturers' reports to the Department of Commerce.

As the gain in women's silk was so much greater than that for hosiery of all classes, it is apparent the burden of the loss fell on cotton goods. Production of all classes of hosiery increased but five per cent during the six-months' period, while in the cotton division, which embraces mercerized, there was a decrease of 10 per cent. Any seeming discrepancies in the comparisons can be accounted for by an analysis of the statistics relating to hosiery of silk and artificial silk in mixture, and keeping in mind the fact that much of the pattern half hose is in the cotton division.

Activity in hosiery centers largely in women's full fashioned silk. It is the one classification in which there has been demand in excess of output. It was bought further ahead than for years, and full fashioned mills not sold up to the end of December are the exception. A Philadelphia establishment, formerly selling to retailers and which this year swung into the jobber column, had nothing to offer last month for deliveries prior to February. Several of the Philadelphia old timers distributing through jobbers also have declined business for January.

While there seems no doubt the full fashioned orders on manufacturers' books are there to stay until deliveries have been completed, some mill heads would feel easier if jobbers were more prompt in forwarding specifications. Until these have been received some hosiery in the gray will accumulate. That mill heads are confident demand will at least run abreast of supplies is indicated by the fact there has been no curtailing of output. But they could accept some business they are declining in order to avert an oversold situation.

Order details will be coming along in better fashion this month, and by October there probably will be another raid on mills for deliveries for Winter and, in particular, for the holiday trading season. Some jobbers who deferred sending specifications were notified by a few mills that shipments would be on the allotment basis, one manufacturer promising but 60 per cent of the unfilled orders. This was an outcome of the mistaken policy of leaving orders open for as long a time as possible, which usually is viewed as a loophole for repudiating an order. Many jobbers proceeded on the assumption that at the rate full fashioned production was being increased there would be a surplus by Fall. Some day there will be, no doubt, but that day hardly can be said to be in the 1925 calendar.

The position of the manufacturer has been strengthened by a firmer tone in the raw silk market, notwithstanding there has been no big buying movement. Fluctuations have been along a narrow margin, tending higher, and by the middle of August prices for raw were at the peak on the Summer movement, and around 20 cents above the low. Manufacturers were waiting for a downward turn, and during the wait the market went against them. Even before the mid-August rise there were intimations mill prices of hosiery would be increased. These eventually assumed the dignity of semi-official reports. But at last accounts there had been no revision nor was any in sight, possibly because there were too many open orders to be reckoned with.

The market position of the mills was stronger last month than in July. There was an increase in new business offered, practically all for immediate deliveries. A representative manufacturer who had sealed some of the open orders on his books, that he might take on some of the spot business, said none of the jobbers was buying for future. Their right-away orders were a revelation, in some instances, disclosing stocks down to almost the bare boards in some of the representative jobbing establishments.

For the same reason mills had not been contracting for future silk requirements distributors were withholding their hosiery orders. They have been doing precisely what they did a year ago, when there was a presidential election ahead. It was the procrastination in the latter part of Summer and early Winter that precipitated an almost phenominal demand, beginning last January and continuing with little interruption through the Summer. A nine months business was crowded into six, and mills were overwhelmed. Bigger output has gotten them out of the jam. The situation is easier, but still not satisfactory to hand-to-mouth merchants.

Someone seems to have played an adroit move for checkmating the contemplated advance. While in some instances buyers were paying the equivalent for a premium on spot delivery 52 gauge hosiery, others were being underquoted, according to some who apparently were out to take advantage of soft spots in the market. It seems there were offers to shade by 25 to 50 cents a dozen, but they did not come from establishments that had or could get the goods. So far as obtaining an order was concerned, they were no more successful than if they had quoted a dollar below the market.

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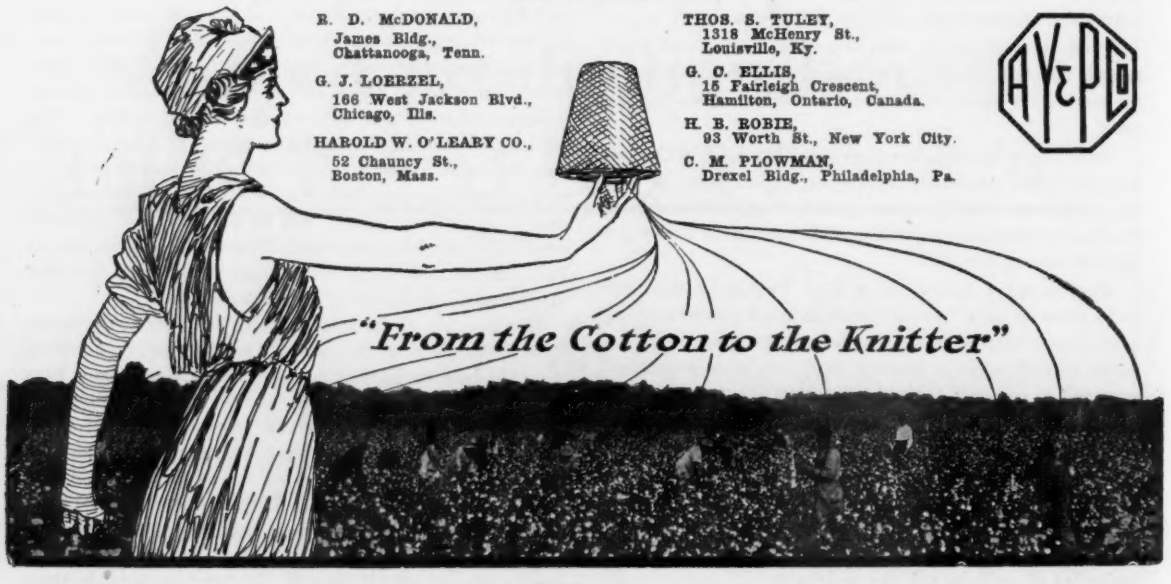

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To the surprise of some primary market factors, there is much interest in export circles for silk and rayon hosiery for British account, despite the fact an import duty became effective in England on July 1. Much hosiery had been rushed to United Kingdom ports for heading off the duty, and of the exports in June the United Kingdom took 82 per cent of the silk and 60 per cent of the artificial silk —more silk hosiery than the total exports for any pervious month this year, and more of the artificial silk than was exported in any month in a long time to and including February last.

England likes American hosiery, and is believed to be buying for next Spring, although deliveries for September-October are specified. One explanation for recent contracting was that buyers for export felt there was a Summer quiet in the American markets and that therefore attractive prices would be named by mills in need of business and interested in maintaining their foreign relations. There is reported good inquiry especially for women's spring needle hosiery, and for short boot light weight silk and rayon goods for South American countries, where it is necessary to keep the weight of the silk content down for escaping customs duty.

The domestic markets are absorbing better than the usual quantities of women's artificial silk boot hosiery, at around $3.25 a dozen, and it is reported there is some Spring business to be had if sellers are willing to shade prices a trifle.

A question uppermost with manufacturers of men's half hose is, will fancies be the proper caper next year? Some manufacturers and distributors say yes, and others no. Regardless of how they appear to feel about it, few are stocking up with novelties for Spring. A mill making them in combination yarns is one of a very few reported as having taken any worthwhile business for 1926. A promising line is made of rayon, silk and mercerized yarn in combination, in a variety of stripe designs. It is sold well up, and it is stated no new business is being accepted for deliveries before December. But this is 1925 business.

Making the future of novelty half hose doubtful is the fact golf hosiery for men and boys appears to be fast coming to the front for next year. This is interpreted as pointing to knickers becoming more popular for street wear. Several manufacturers of golf stockings, of mercerized, at 75 cents to a dollar a pair in retail stores, are supplied with orders that will keep their plants at capacity operation to well beyond the end of the year. Among these is the Unique Knitting Co., Philadelphia, which has declined no little business on its leading number.

There was reported last month a radical decline in demand for fancy half hose of silk and rayon in combination, being offered to a commission house at $3.15 a dozen, which was about the price for plain colors and of seconds in patterns. "We can't give them away," said the executive, who, however, had substantial inquiries for rayon plaited on mercerized, at $2.75 to $3 a dozen to jobbers. There developed also some interest in men's plain mercerizezd half hose, which have been showing better for some few months. Women's staple mercerized, a strong item in the export trade, also has been receiving slightly more attention in the domestic markets. Combed yarn hosiery, for men and women, is reported in lessened call. It has been a standby for dealers wanting a quarter-dollar stocking, but as between the high grade carded and a rayon sock in the moderate price range it seems to be in a weak position.

That production of mercerized hosiery was on the in-

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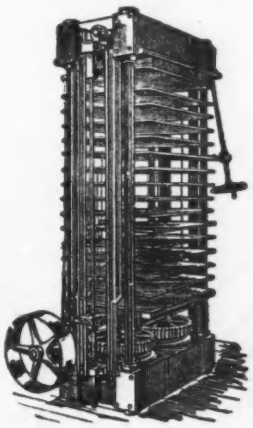

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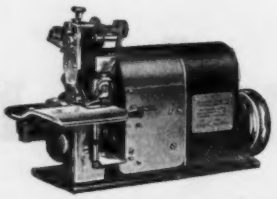

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SALES OFFICE: Lafayette Bldg., Philadelphia
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MERCERIZED YARNS

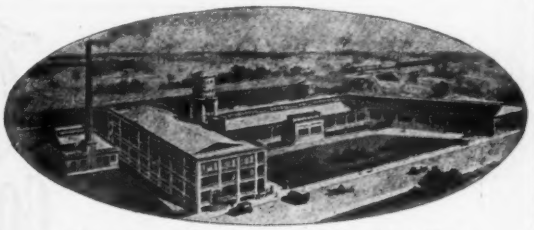
crease was reflected in the demand for mercerized yarns. Philadelphia mercerizers last month, and in July as well, were having about all the business they could handle, and southern mercerizers were reported also getting a fine volume. A large part of this demand, obviously, came from manufacturers of women's silk hosiery with mercerized top and foot. "We never were so pressed for deliveries during the Summer," said a well known Philadelphia mercerizer. A part of this was ascribed to the use of mercerized yarn in hosiery intended to carry printed patterns.

With novelties for next season apparently in the balance, it is questioned whether it might not be expedient to proceed slowly with printed hosiery. Several representative jobbers say they are cleaning up their stocks and will not put prints in their line for 1926. Yet the Cadet Knitting Co., Philadelphia, selling to retailers exclusively, shows several new printed designs for next Spring. An extreme novelty in printing is a woman's stocking, of flesh color, on which there is printed a half hose, the simulation being complete from the hem top to the point of the toe. Mill models who have displayed this stocking for the benefit of intending buyers were, to all appearances, wearing only a man's half hose. Thus far the stocking has had a tryout on models only.

The Cadet is taking advance ground in the matter of printing on wearing apparel, showing sweater coats, from its western mill, in printed patterns not easy to duplicate in knitting. The company also is showing bathing suits printed in marine and aquatic subjects. One of its leading colors for bathing suits for next season is nude, others being harvest and straw. But this is another subject, the company's long suit at present being hosiery and its dark point Van Dyke in full fashioned construction, which has been dividing honors with the Pointex heel. The Van Dyke seems to have moved from the novelty to the staple class, as was the case with juvenile fancy top seven-eighth length hose.

New designs in misses' sports hose are winning fair business for spring. One mill shows innovations in the fancy top, suggestive of a cross between the Jacquard and Brinton stitch. Some leading manufacturers are making fewer numbers, each in their distinctive patterns, and find this more satisfactory than undertaking to originate many and copy the leaders of rivals. Buying of the seven-eighth lengths is, generally speaking, on a conservative basis, pending something definite on the subject of boys' golf hose and the probability of their adoption for misses' wear.

From the manufacturer's viewpoint the situation as to infants' socks is far better than a year ago. Most of the larger jobbers have placed firm orders for a large part of prospective needs, and there is enough tentative orders awaiting details to make it appear mills will be assured a steady run to the end of their delivery season. A well known manufacturer, with whom conditions probably are typical of those in other strongly entrenched mills, says he is 60 days ahead of last year in the matter of putting goods in process. Orders for deliveries commencing in September and running through December are being made up, and it is confidently expected that by the time these have been completed details for others will have been received. Numbers of the smaller jobbers usually do not make their commitments before October. By the time these shall have been heard from mills will be well fortified with business for the Winter and late into Spring.



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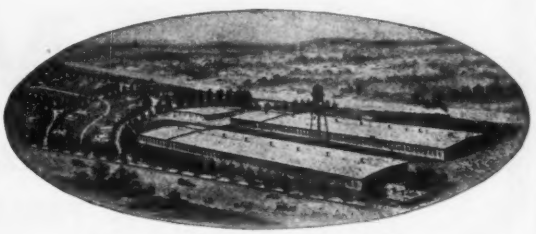

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In a new line of infants' socks, brought out in August, colors are blended in rainbow fashion, some rare prismatic effects being shown. Samples did not make their appearance until after there had been considerable contracting. They have been well received as an innovation more suggestive of the very chaste than an attempt to carry novelty a step further than what was the extreme to date.

Winter hosiery, in worsted, and wool and artificial silk in combination, has been contracted for on a rather liberal scale, and sports effects in mercerized have appealed to many distributors. As to women's hosiery, there is no little discussion as to how far chiffon silk may affect the business in silk-and-wool. There seems to have been no subsidence of demand for chiffons for Fall and Winter. They have been bought up for deliveries through December, orders still are reaching mills, and several manufacturers last month diverted a few more full fashioned from service weight stockings to the sheer. It thus appears the trade is stocking up for a chiffon Winter, and necessarily carrying less of the wool lines.

Low end carded yarn hosiery of 176 needle construction, for men and women, is in a comparatively good positin, being subject to less competition, perhaps, than any other class. Compared with the output, demand is all of fair. While in the North a few weeks ago John M. Berry, Rome (Ga.) Hosiery Mills, one of the larger manufacturers of such lines, said the mill had been operating day and night for nine months and that the production was larger than for the preceding twelve. Mr. Berry said he had no goods in stock not covered by orders, and that as he is selling on a very close margin, his organization is allowing no discount for anticipations. Checks offered in settlement of an invoice from which discount has been deducted for anticipation are returned, he said.

Underwear.

Cotton underwear values are being sustained in a market that is brisk and dull by fits and starts. Numbers of jobbers were waiting for a slipping in cotton and, in sequence, downward revisions in prices for underwear. Some affected to believe it might be expedient to wait for 20 cent cotton, and deferred their commitments. Then, too, they were banking on more than the usual seasonal dullness and a bidding by manufacturers for business. Meanwhile small business was being booked by practically all mills and some rather large orders being written by others—those whose lines carry a touch of the distinctive and are going each year to the same jobbers, and more being added.

By the middle of August light weight underwear for men and women had been pretty well bought up for the next season. Pennsylvania manufacturers of women's vests and union suits have had an almost uninterrupted run of plants and have orders which will carry them through for some little time. The situation with them is the better since so many Schuylkill Valley mills gave up the struggle in competition with artificial silk underwear. Some that discontinued their cotton lines are making only the artificial silk and some that stood by through thick and thin are producing both.

Keen competition is developing in the artificial silk lines, and some few manufacturers, among them the Ogontz Manufacturing Co., Philadelphia, found it expedient to add to their equipment This company makes only the cloth. Harcher & Annable, also Philadelphia, who started in busi-

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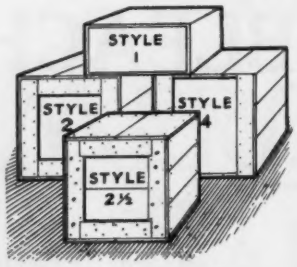

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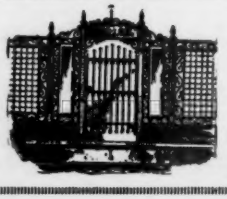

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ness less than a year ago, and knit the cloth for the garments they are making, said some time ago that every order had been followed by a repeat, and they, too, are operating at a good stage.

Artificial silk underwear, like full fashioned silk hosiery, has been popularized through the direct sellers employing door-to-door canvassers. "These peddlers are not such a bad institution, after all," said a manufacturer whose line is being taken by direct sellers, as well as jobbers. The latter report their sales of the rayon garments increasing, and a few do not miss an opportunity to help out a peddler not having a direct connection with some established door-to-door house.

Nainsook and soisette promise to be a big item in next season's distribution of men's light underwear. The woven cut-and-sewed has been brought out in fancy stripes and a design as delicate as some of those in women's lines. The Chalmers Knitting Co. is reported having an especially attractive line, embracing many numbers, to sell at the counter at one dollar and $1.50 a suit respectively, in competition with several of the nationally advertised lines. Jobbers are buying quite freely of nainsooks, according to some of their buyers, and are looking forward to a big increase over the sales for the current season, when conditions were somewhat disturbed for them by price competition in branded goods that are widely known.

Nainsook suits, it is believed, will make their deepest cut in the business in bal briggans. Ribs appear to be the better proposition in the knitted. But it seems not improbable that production will not be as great, of either, as for the current season. It is no secret that the popularity of the woven is causing manufacturers of the knitted some uneasiness. A few who hitherto banked their all on bals and ribs now are making nainsooks. Interest in the latter is given as an explanation of the tardiness of jobbers to contract as formerly for the knitted. There are manufacturers of high grade goods in this division who have, however, booked more business to date than to the middle of August, 1924. Looking for the reason for this, it appears that merchandising policy and character of merchandise are entitled to about equal credit. The same conclusion applies to underwear for Fall and Winter.

As was expected of heavy weight underwear, it was in better demand last month, as jobbers had been booking retailer orders and will begin shipping out in September. Retailers are reported making very conservative commitments, and some of those in the anthracite coal belt were reserving the right to cancel orders in the event of a strike occurring. Jobbers took the orders, nevertheless, on the theory they had nothing to lose; that if some orders were cancelled they still would be ahead of the game and that if one house did not accept them another would. Besides, there was the "good customer," who always must be taken care of, rain or shine. The average jobber is believed to be not so committed that, beyond the loss of sales, he would not be much hurt by even more than the average per cent of cancellations. If the orders stick, he believes, he will have little difficulty in getting the goods. Really, the manufacturer was left to bear the burden of conditions due to the possibility of a hard Winter in the mining regions.

The conditions existing in the coal fields and in the New England cotton manufacturing centers is by no means general. Business is coming through in satisfactory volume from the West, South and Middle West, repeat orders

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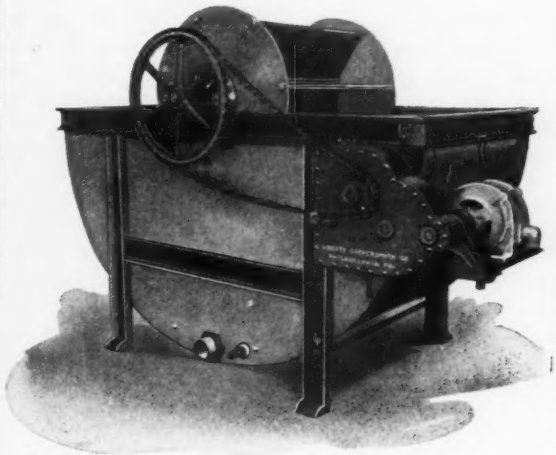

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are being received and, in some instances, sales and shipments are ahead of those to the end of Summer last year. In fact, one large mill is accepting no new accounts until a study of the probable wants of patrons of former years reveals whether it might be safe to take them. It seems a certainty that by the end of Fall some few manufacturers will have nothing to offer for Winter.

Sweater manufacturers have had perhaps the most unsatisfactory season for several years. For the first time in 50 years, a Philadelphia mill, according to an executive, was idle for lack of orders. Scales of certain novelty and sports types held up fairly well, but some of these became a dubious proposition when the vacation period was near the end. In August there was renewed buying of shakers and a few other staple lines, including the Tuxedo coat for women. The latter are wearing fewer sweaters, except on the field of sports, and this accounted in large measure for the dull situation among numbers of mills.

The shaker coat is rated in the trade the better Winter proposition. Some mills have had duplicate orders, and in a general way it appeared last month that the worst had passed and that there was promise of a fairly brisk Fall.

Bathing suit manufacturers have booked a fair volume of business for the 1926 season. Retail sales in July and August ran far ahead of those for the corresponding months of any previous year, and there was a demand, at times, that could not be met by mills. There is no likelihood of such a tight situation next Summer, as a number of sweater manufacturers have added bathing suits to their lines. Some interests fear overproduction. Jobbers troubled with this nightmare obviously are disposed to contract conservatively, the more so for the reason price cutting began almost the day that lines were opened. Ribbed suits and fancies will lead. Both will be shorter in construction than in supply. Considerably less cloth will be required to make next season's garments, measured by demand this year, but more suits will be used, all interests agree.

A Trend.

Some knitted outerwear interests with whom business in sweaters has been lagging have been attracted to the bal briggan cloth field, which at the moment looks very promising, it is stated. Used machinery adapted to the knitting of this and jersey cloth is in much demand, it is stated by an establishment dealing in second-hand machinery. There are three types of bal briggan cloth each of which has figured extensively in women's one-piece suits. They are of straight worsted, cotton and wool in combination, and worsted and rayon.

A northern underwear manufacturer last month installed a half dozen coarse gauge machines and a Virginia hosiery manufacturer was in quest of 50 knitting machines and a battery of ribbers. Machinery was bought also for children's small size hosiery, and is in strong demand for bathing suit manufacture, flat and ribbed.

Century Electric Company, St. Louis, Missouri, has issued a descriptive folder concerning its repulsion start, induction single-phase motors

Among the Knitting Mills.

Solon D. Bausher & Sons, proprietors of the Glorie Underwear Mills, Reading, Pa., will establish a $200,000 plant at Eufaula, Ala., for underwear and hosiery manufacturing and dyeing and bleaching. Equipment from the Reading plant will be removed to the Alabama city, it is understood.

The Magnet Knitting Mills, which will install full fashioned machinery at their Clinton, Tenn., plant, have let contract to Brown-Harry Construction Company, Gastonia, N. C., for the construction of the new building to house this equipment. The structure will be 96 x 230 feet, two story, of reinforced concrete construction. J. E. Sirrine & Company, Greenville, S. C., are the engineers.

The Cartex Underwear Company, Reidsville, N. C., will double its capacity in the near future, it is reported.

Princeton Hosiery Mills Co., Princeton, W. Va., will add twenty new knitting machines to their equipment.

Contract for the erection of a plant addition has been let by the Knoxville Knitting Mills Company, Knoxville, Tenn.

The Erwin Manufacturing Company, Huntsville, Ala., has been organized with a capital of $50,000. It is understood knit underwear will be manufactured. J. F. Chambers is president, R. E. McDonald, agent of the Lowe Manufacturing Company is vice-president, and L. O. Erwin, formerly superintendent of the Huntsville Knitting Mills, is superintendent, secretary and treasurer.

Chipman-Burrows Hosiery Mill Co., Flat Rock, N. C., has been organized with a capital of $200,000. Alfred W. Wheeler and associates are the incorporators.

Read Hosiery Mill, McMinnville, Tenn., is erecting a 40 x60 foot addition to the plant at that place.

Onyx Hosiery, Inc., Wharton, N. J., has awarded contract for the erection of two one-story additions to the mill at Wharton, 40x64 feet, and 25x32 feet, which will be used as power house and dye house.

Drexel Knitting Mills, Drexel, N. C., has begun the construction of a brick building, two stories high, which will replace the wooden building formerly used by the mill.

A three-story addition, 40x90 feet, is being constructed by W. W. Moyer, Ephrata, Pa.

Contract for the erection of buildings for the Avalon Knitwear Company plant at Anniston, Ala., has been awarded to C. F. Duke, Anniston. The buildings will include a knitting mill, dyehouse, machine shop and boiler house. John Hill, Healey Building, Atlanta, Ga., is the engineer.

The Unique Knitting Co., Philadelphia, in August removed from Frankford Avenue to Westmoreland and Emerald Street, where it is occupying an entire building of three floors and a basement. Machinery for doubling the plant capacity will be installed. The company manufactures men's and boys' golf hose and misses' sports ribs, and for some time has been operating day and night.

The Lincoln Hosiery Corporation, controlled by Ely & Walker Dry Goods Co. interests, required more room for its full fashioned plant at Allegheny Avenue and A Street, Philadelphia, and removed the seamless equipment to Indiana Avenue and A Street. S. A. Kahman, formerly hosiery buyer for Ely & Walker Dry Goods Co., is the manager, and is understood to have materially increased the mill's sales.